HITACHI

AW	NO. 0013E

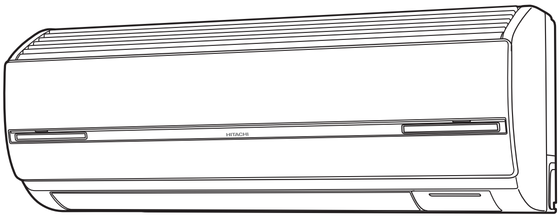
RAS-25JX5 / RAC-25JX5
RAS-35JX5 / RAC-35JX5

SERVICE MANUAL

TECHNICAL INFORMATION

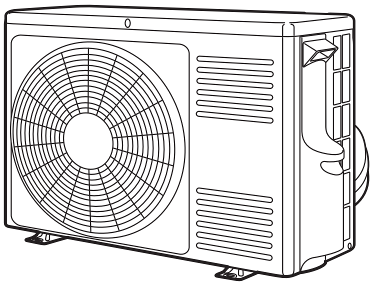
REFER TO THE FOUNDATION MANUAL

FOR SERVICE PERSONNEL ONLY



RAS-25JX5
RAS-35JX5





RAC-25JX5
RAC-35JX5

CONTENTS

SPECIFICATIONS

TYPE			DC INVERTER (WALL TYPE)			
			INDOOR UNIT	OUTDOOR UNIT	INDOOR UNIT	OUTDOOR UNIT
MODEL			RAS-25JX5	RAC-25JX5	RAS-35JX5	RAC-35JX5
POWER SOURCE			1 PHASE, 50Hz, 220-230V		1 PHASE, 50Hz, 220-230V	
COOLING	TOTAL INPUT	(W)	580 (155 - 1,160)		990 (155 - 1,380)	
	TOTAL AMPERES	(A)	3.11 - 2.97		4.74 - 4.54	
	CAPACITY	(kW)	2.50 (0.90 - 3.10)		3.50 (0.90 - 4.00)	
		(B.T.U./h)	8,530 (3,070 - 10,580)		11,940 (3,070 - 13,650)	
HEATING	TOTAL INPUT	(W)	795 (115 - 1,170)		1,040 (115 - 1,350)	
	TOTAL AMPERES	(A)	4.02 - 3.85		4.98 - 4.76	
	CAPACITY	(kW)	3.40 (0.90 - 4.40)		4.20 (0.90 - 5.00)	
		(B.T.U./h)	11,600 (3,070 - 15,010)		14,330 (3,070 - 17,060)	
DIMENSIONS (mm)		W	790	750 (+91)※	790	750 (+91)※
		H	298	548	298	548
		D	210	288 (+47)※	210	288 (+47)※
NET WEIGHT		(kg)	10	35	10	35

※ After installation

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

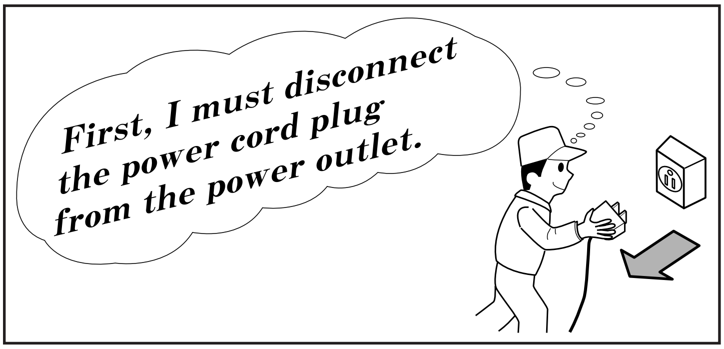
ROOM AIR CONDITIONER

INDOOR UNIT + OUTDOOR UNIT

JANUARY 2006 Hitachi Household Appliances (Wuhu) Co.,Ltd.

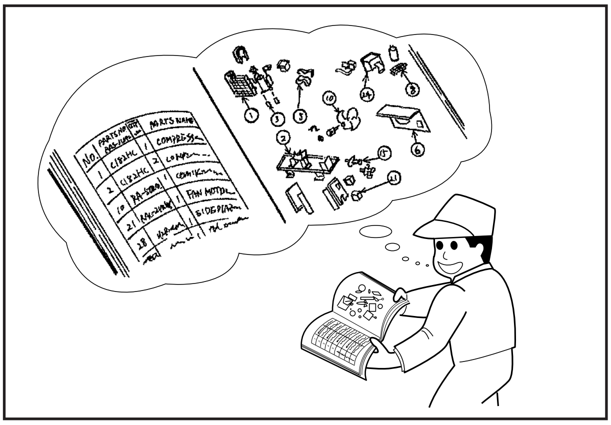
SAFETY DURING REPAIR WORK

1. In order to disassemble and repair the unit in question, be sure to disconnect the power cord plug from the power outlet before starting the work.



2. If it is necessary to replace any parts, they should be replaced with respective genuine parts for the unit, and the replacement must be effected in correct manner according to the instructions in the Service Manual of the unit.

   If the contacts of electrical parts are defective, replace the electrical parts without trying to repair them



3. After completion of repairs, the initial state should be restored.

4. Lead wires should be connected and laid as in the initial state.

5. Modification of the unit by the user himself should absolutely be prohibited.

6. Tools and measuring instruments for use in repairs or inspection should be accurately calibrated in advance.

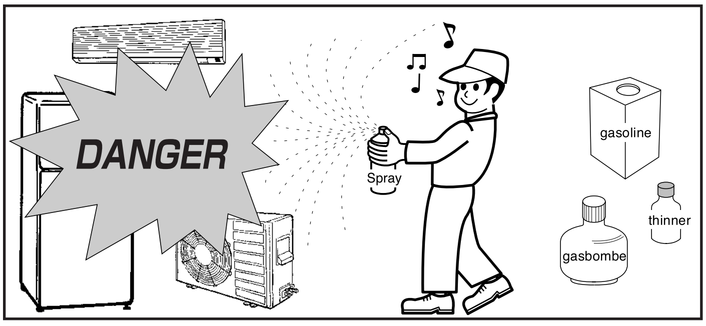
7. In installing the unit having been repaired, be careful to prevent the occurrence of any accident such as electrical shock, leak of current, or bodily injury due to the drop of any part.

8. To check the insulation of the unit, measure the insulation resistance between the power cord plug and grounding terminal of the unit.
   The insulation resistance should be 1MΩ or more as measured by a 500V DC megger.

9. The initial location of installation such as window, floor or the other should be checked for being safe enough to support the repaired unit again.
   If it is found not so strong and safe, the unit should be installed at the initial location after reinforced or at a new location.

10. Any inflammable object must not be placed about the location of installation.

11. Check the grounding to see whether it is proper or not, and if it is found improper, connect the grounding terminal to the earth.



WORKING STANDARDS FOR PREVENTING BREAKAGE OF SEMICONDUCTORS

1. Scope

The standards provide for items to be generally observed in carrying and handling semiconductors in relative manufactures during maintenance and handling thereof. (They apply the same to handling of abnormal goods such as rejected goods being returned.)

2. Object parts

(1) Micro computer

(2) Integrated circuits (I.C.)

(3) Field effective transistor (F.E.T.)

(4) P.C. boards or the like to which the parts mentioned in (1) and (2) of this paragraph are equipped.

3. Items to be observed in handling

(1) Use a conductive container for carrying and storing of parts. (Even rejected goods should be handled in the same way.)

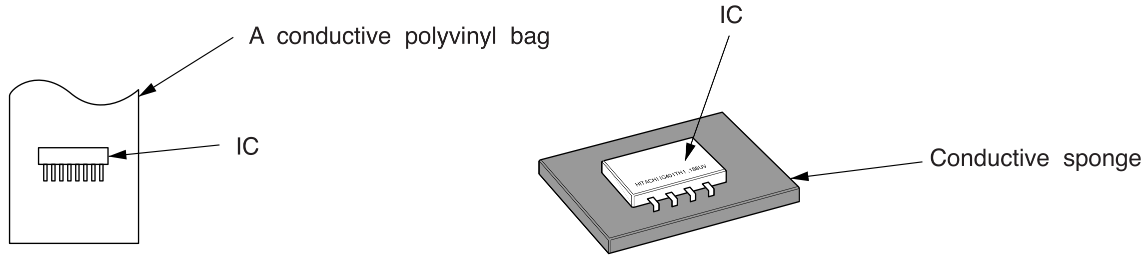


Fig. 1 Conductive container

(2) When any part is handled uncovered (in counting, packing and the like), the handling person must always use himself as a body earth. (Make yourself a body earth by passing one M ohm earth resistance through a ring or bracelet.)

(3) Be careful not to touch the parts with your clothing when you hold a part even if a body earth is being taken.

(4) Be sure to place a part on a metal plate with grounding.

(5) Be careful not to fail to turn off power when you repair the printed circuit board. At the same time, try to repair the printed circuit board on a grounded metal plate.

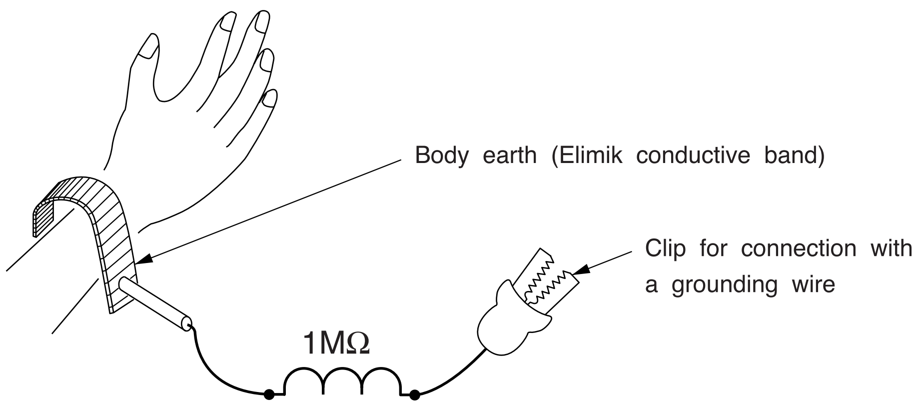


Fig. 2 Body earth

(6) Use a three wire type soldering iron including a grounding wire.

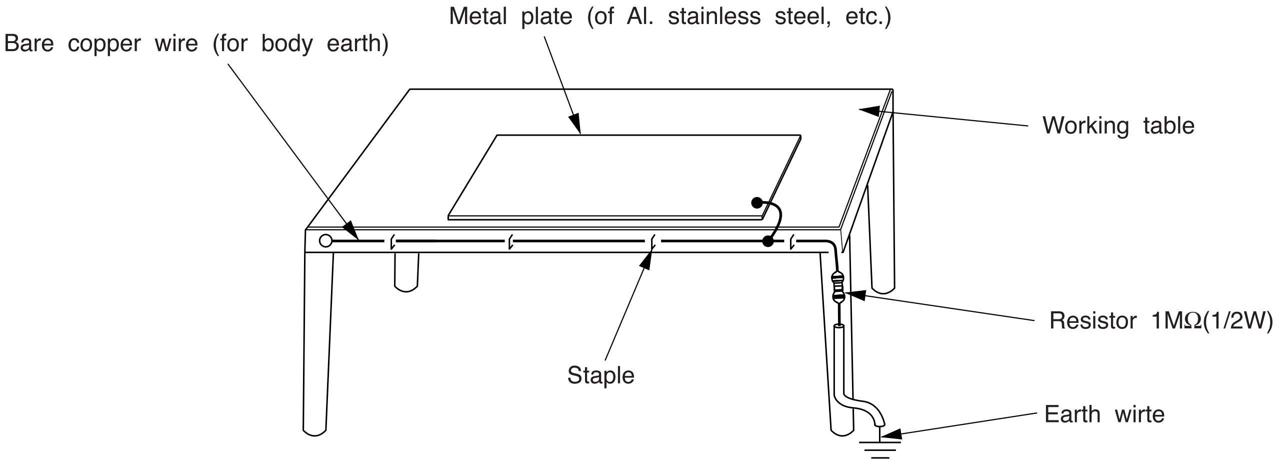


Fig.3 Grounding of the working table

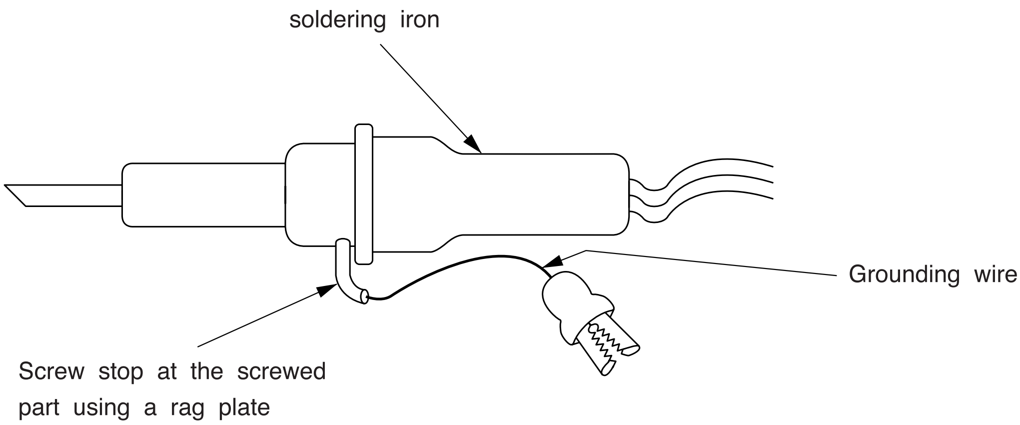


Fig.4 Grounding a solder iron

Use a high insulation mode (100V, 10MΩ or higher) when ordinary iron is to be used.

(7) In checking circuits for maintenance, inspection, or some others, be careful not to have the test probes of the measuring instrument shortcircuit a load circuit or the like.

⚠ CAUTION

1. In quiet operation or stopping the running, slight flowing noise of refrigerant in the refrigerating cycle is heard occasionally, but this noise is not abnormal for the operation.

2. When it thunders near by, it is recommend to stop the operation and to disconnect the power cord plug from the power outlet for safety.

3. The room air conditioner does not start automatically after recovery of the electric power failure for preventing fuse blowing. Re-press START/STOP button after 3 minutes from when unit stopped.

4. If the room air conditioner is stopped by adjusting thermostat, or missoperation, and re-start in a moment, there is occasion that the cooling and heating operation does not start for 3 minutes, it is not abnormal and this is the result of the operation of IC delay circuit. This IC delay circuit ensures that there is no danger of blowing fuse or damaging parts even if operation is restarted accidentally.

5. This room air conditioner should not be used at the cooling operation when the outside temperature is below –10°C (14°F).

6. This room air conditioner (the reverse cycle) should not be used when the outside temperature is below –15°C (5°F) .
   If the reverse cycle is used under this condition, the outside heat exchanger is frosted and efficiency falls.

7. When the outside heat exchanger is frosted, the frost is melted by operating the hot gas system, it is not trouble that at this time fan stops and the vapour may rise from the outside heat exchanger.

SPECIFICATIONS

MODEL		RAS-25JX5 RAS-35JX5	RAC-25JX5 RAC-35JX5
FAN MOTOR		25W (DC35V)	40W (DC350V)
FAN MOTOR CAPACITOR		NO	NO
FAN MOTOR PROTECTOR		NO	NO
COMPRESSOR		—	EU1011DF
COMPRESSOR MOTOR CAPACITOR		NO	NO
OVERLOAD PROTECTOR		NO	YES
OVERHEAT PROTECTOR		NO	YES
FUSE (for MICROPROCESSOR)		NO	3.0A
POWER RELAY		NO	G4A
POWER SWITCH		YES	NO
TEMPORARY SWITCH		YES	NO
SERVICE SWITCH		NO	YES
TRANSFORMER		NO	NO
VARISTOR		NO	450NR
NOISE SUPPRESSOR		NO	YES
THERMOSTAT		YES(IC)	YES(IC)
REMOTE CONTROL SWITCH (LIQUID CRYSTAL)		YES	NO
REFRIGERANT CHARGING VOLUME (Refrigerant 410A)	UNIT	----------	870g
	PIPES (MAX. 20m)	WITHOUT REFRIGERANT BECAUSE COUPLING IS FLARE TYPE.	

HOW TO USE

SAFETY PRECAUTION

- Please read the "Safety Precaution" carefully before operating the unit to ensure correct usage of the unit.
- Pay special attention to signs of "⚠ WARNING" and "⚠ CAUTION". The "Warning" section contains matters which, if not observed strictly, may cause death or serious injury. The "Caution" section contains matters which may result in serious consequences if not observed properly. Please observe all instructions strictly to ensure safety.
- The signs indicate the following meanings. (The following are examples of signs.)

⃠ This sign in the figure indicates prohibition.	❗ Indicates the instructions that must be followed.

- Please keep this manual after reading.

PRECAUTIONS DURING INSTALLATION

⚠ ARNING

- Do not reconstruct the unit.
  Water leakage, fault, short circuit or fire may occur if you reconstruct the unit by yourself. (PROHIBITION)
- Please ask your sales agent or qualified technician for the installation of your unit.
  Water leakage, short circuit or fire may occur if you install the unit by yourself.
- Please use earth line.
  Do not place the earth line near water or gas pipes, lightning-conductor, or the earth line of telephone. Improper installation of earth line may cause electric shock. (CONNECT EARTH LINE)
- Be sure to use the specified piping set for R410A. Otherwise, this may result in broken copper pipes or faults.

⚠ CAUTION

- A circuit breaker should be installed depending on the mounting site of the unit. Without a circuit breaker, the danger of electric shock exists.
- Do not install the unit near location where there is flammable gas.
  The outdoor unit may catch fire if flammable gas leaks around it. Piping shall be suitable supported with a maximum spacing of 1m between the supports. (PROHIBITION)
- Please ensure smooth flow of water when installing the drain hose. If any failure is found in the drain path, water drops from the indoor and outdoor units, causing wet household effects.
- Make sure that a single phase 230V power source is used.
  The use of other power sources may cause electrical components to overheat and lead to fire. (PROHIBITION)

PRECAUTIONS DURING SHIFTING OR MAINTENANCE

⚠ WARNING

- Should abnormal situation arise (like burning smell), please stop operating the unit and remove plug from the socket or turn off the circuit breaker. Contact your agent. Fault, short circuit or fire may occur if you continue to operate the unit under abnormal situation. ("OFF")
- Please contact your agent for maintenance.
  Improper self maintenance may cause electric shock and fire.
- Please contact your agent if you need to remove and reinstall the unit.
  Electric shock or fire may occur if you remove and reinstall the unit yourself improperly.
- Avoid an extended period of direct air flow for your health. (PROHIBITION)
- Do not connect the power calbe with an extension cable or do not plug too many leads of the other electric appliance into the socket where this cable is plugged. In addition, wire the cable with some allowances to prevent the cable from stretching. Not doing so will cause an electrical shock, heat generation or fire. (PROHIBITION)
- Do not bundle the power cable, pull it, put something on it, heat it, process it, or put it between things. Breakage of the power cable may result.
  Use of a damaged cable may cause an electrical shock or a fire. (PROHIBITION)
- (PROHIBITION) Do not put objects like thin rods into the panel of blower and suction side because the high-speed fan inside may cause danger.

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PRECAUTIONS DURING OPERATION

⚠ WARNING

- Do not use any conductor as fuse wire, this could cause fatal accident. (PROHIBITION)
- ("OFF") During thunder storm, please stop operating the unit and turn off the circuit breaker.
- Spray cans and other combustibles should not be located within a meter of the air outlets of both indoor and outdoor units.
  As a spray can's internal pressure can be increased by hot air, a rupture may result. (PROHIBITION)

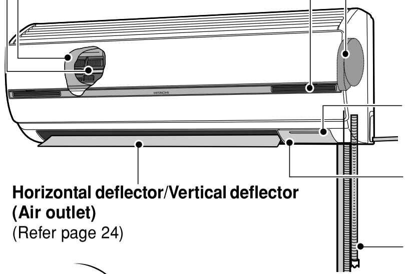
⚠ CAUTION

- The product shall be operated under the manufacturer specification and not for any other intended use. (PROHIBITION)
- (DON'T WET) Do not attempt to operate the unit with wet hands. this could cause fatal accident.
- When operating the unit with burning equipments, regularly ventilate the room to avoid oxygen insufficiency. (STRICTLY OBSERVE PRECAUTIONS)
- (PROHIBITION) Do not direct the cool air coming out from the air-conditioner panel to face household heating apparatus as this may affect the working of apparatus such as the electric kettle, oven etc.
- Please ensure that outdoor mounting frame is always stable, firm and without defect. If not, the outdoor unit may collapse and cause danger. (PROHIBITION)
- (PROHIBITION) Do not wash the unit with water or place a water container such as a vase on the indoor unit.
  Electrical leakage could be present and cause electric.
- Do not place plants or animals directly under the air flow as it is bad for the plants or animals. (PROHIBITION)
- (PROHIBITION) Do not climb on the outdoor unit or put objects on it.
- When operating the unit with the door and windows opened, (the room humidity is always above 80%) and with the air deflector facing down or moving automatically for a long period of time, water will condense on the air deflector and drips down occasionally. This will wet your furniture. Therefore, do not operate under such condition for a long time. (PROHIBITION)
- (PROHIBITION) If the amount of heat in the room is above the cooling or heating capability of the unit (for example: more people entering the room, using heating equipments and etc.), the preset room temperature cannot be achieved.
- Indoor unit cleaning must be performed by authorized personnel only. Consult your sales agent.
  Using a commercially available detergent or similar can damage the plastic parts or clog the drain pipe, causing water to drip with potential electric shock hazard. (PROHIBITION)
- (DON'T TOUCH) Do not touch the air outlet, bottom surface and aluminum fin of the outdoor unit.
  You may get hurt.
- Do not touch the refrigerant pipe and connecting valve.
  Burns may result. (DON'T TOUCH)

ENGLISH

NAMES AND FUNCTIONS OF EACH PART

INDOOR UNIT



Air Purification Unit (Internal)
This traps cigarette smoke, pollen, etc. (Refer page 10)

Pre-Filter (Internal)
To prevent dust from coming into the indoor unit. (Refer page 27)

Horizontal deflector/Vertical deflector (Air outlet)
(Refer page 24)

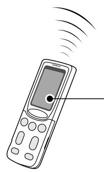
Fresh Air Window
This blows air from outside into the room while the fresh air in is operating.

Two Way Air Exchange Fan (Internal)
This operates when the Two Way Air Exchange is operating.

Indoor Unit Indicators
Light indicator showing the operating condition. (Refer page 7)

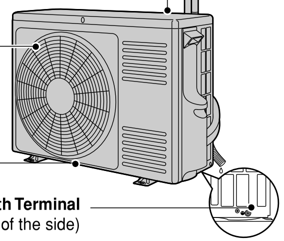
Signal Receiver
Receive the signal from the remote controller.

Two Way Air Exchange Hose
This vents air from outside the room when the fresh air in is operating. This vents air within the room to the outside when the exhaust is operating.



Remote Controller
Send out operation signal to the indoor unit. So as to operate the whole unit. (Refer page 8)

OUTDOOR UNIT



Air Outlet
When "heating" operation is performed, cool air blows and when "cooling" or "dehumidifying" operation is performed, warm air blows.

Drain Port (Bottom)

Earth Terminal
(Lower section of the side)

Drain Hose
Drains the dehumidified water from the indoor unit to the outdoor during "cooling" or "dehumidifying" operation.

Piping and Wiring

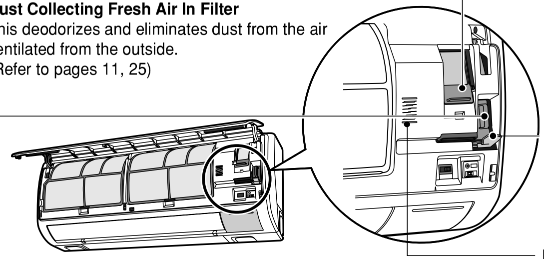
Air Inlets (Rear and left sides)

About the outdoor unit:
- When "Stop" is selected during operation of the indoor unit, the fan of the outdoor unit continues turning for 10 to 60 seconds to cool the electric parts down.
- In heating operation, condensate or water due to defrosting will flow.
  Do not cover the drain port of the outdoor unit because such water may freeze in the chilly area.
- When the outdoor unit is hung on the ceiling, install the bush and drain pipe on the drain port and drain water.

MODEL NAME AND DIMENSIONS

MODEL	WIDTH (mm)	HEIGHT (mm)	DEPTH (mm)
RAS-25JX5, RAS-35JX5	790	298	210
RAC-25JX5, RAC-35JX5	750	548	288

TWO WAY AIR EXCHANGE DUCT FILTER



Nano-Titanium Disinfecting Deodorizing/ Dust Collecting Fresh Air In Filter
This deodorizes and eliminates dust from the air ventilated from the outside.
(Refer to pages 11, 25)

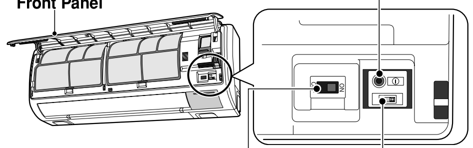
Exhaust Pre-Filter
This traps dirt and dust particles in the air while the exhaust is operating.
(Refer to page 25)

Fresh Air In Pre-Filter
This traps dirt and dust particles in the air ventilated from the outside.
(Refer to pages 11, 25)

Dirt Sensor
The Dirt Sensor detects cigarette smoke, sprays (pesticides), alcohol, etc. (Refer to pages 19, 34)

INDOOR UNIT CONTROL PANEL

■ **Operate after opening the front panel.** (How to open the front panel, refer to page 10.)



Front Panel

Power Switch

Temporary Switch
If the remote controller does not work due to battery failure, press this switch to start and stop operation.
- This temporary operation will be at the most recent setting mode. (The unit will immediately go into automatic operation once power is switched on.)

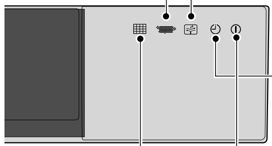
Two Way Air Exchange Selection Switch
Select one of the following: "Prohibit Two Way Air Exchange", "Only Exhaust", and "Operate Two Way Air Exchange".
Please refer to page 33 regarding installation when the Two Way Air Exchange cannot be operated.
(When the device is shipped out of the factory, it is set to "Operate Two Way Air Exchange".)

⚠ CAUTION

Turn off the circuit breaker or pull out the power plug if the unit is not be operated for a long period.

☆ If the power stays on and the unit is not operated, power is slightly consumed in the control circuit. The power is saved by turning off the power switch (or the circuit breaker when the power is supplied from the outdoor unit).

INDOOR UNIT INDICATORS



Two Way Air Exchange Lamp (Green)
This lamp lights when the fresh air in and exhaust are operating.

Self Clean Lamp (Yellow)
This lamp lights when the device is configured to self clean. (Refer page 19)

Timer Lamp (Orange)
This lamp lights when the timer is working.

Filter Lamp (Green)
When the device is operated for a total of about 200 hours, the FILTER lamp lights indicates that it is time to clean the filter. The lamp goes out when the " ⅄ (AUTO SWING)" button is pressed while the operation is stopped. But it does not turn off when self clean is working.

Operation Lamp (Yellow)
This lamp lights during operation.
The OPERATION LAMP blinks in the following cases during heating.
(1) **During Preheating**
For about 2-3 minutes after starting up.
(2) **During Defrosting**
Defrosting will be performed about once an hour when frost forms on the heat exchanger of the outdoor unit, for 5-10 minutes each time.

■ **The "Two Way Air Exchange" lamp blinks in the following cases (It is not abnormal).**

Configuring the Two Way Air Exchange Selection Switch to prohibited setting

- When "Only Exhaust" is selected and "Fresh Air In During Sleep Mode Operation" (page 23) is configured with the remote controller to operate the fresh air in (page 18), the device beeps twice and the "Two Way Air Exchange" lamp blinks (10 seconds).
- When "Prohibit Two Way Air Exchange" is selected and the "Fresh Air In During Sleep Mode Operation" (page 23) or the "Automatic Two Way Air Exchange" (page 19) is configured with the remote controller to operate the fresh air in (page 18), the device beeps twice and the "Two Way Air Exchange" lamp blinks (10 seconds).

While Operating the Two Way Air Exchange

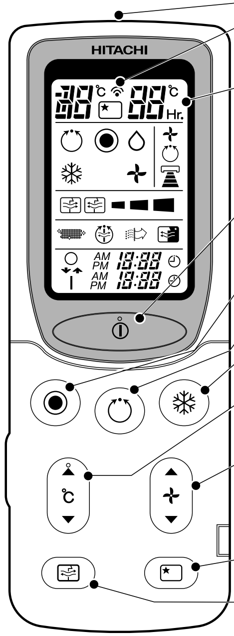
- The two way air exchange is stopped during operation to prevent dew condensation on the two way air exchange fan and hose and to protect the two way air exchange fan due to changes in the room temperature and outside air temperature. At this time, the "Two Way Air Exchange" lamp blinks (lights for 10 seconds/out for 1 second) (page 32).

■ **If the "Two Way Air Exchange" lamp blinks except for the above-mentioned case, the "Two Way Air Exchange" Fan is abnormal. (Refer page 32)**

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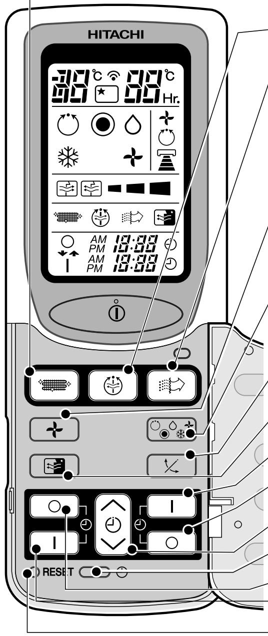
REMOTE CONTROLLER

- This controls the operation of the indoor unit. The range of control is about 7 meters. If indoor lighting is controlled electronically, the range of control may be shorter, in some cases, the control signal may not be received. This unit can be fixed on a wall using the fixture provided. Before fixing it, make sure the indoor unit can be controlled from the remote controller.
- Handle the remote controller with care. Dropping it or getting it wet may compromise its signal transmission capability.
- After new batteries are inserted into the remote controller, the unit will initially require approximately 10 seconds to respond to commands and operate.



- **Signal Emitting Window/Transmission Sign**
Point this window toward the indoor unit when controlling it.
The transmission sign blinks when a signal is sent.
- **Display**
This indicates the room temperature selected, current time, timer status, function and intensity of circulation selected.
- **START / STOP Button**
Press this button to start operation. Press it again to stop operation.
- **HEATING Button**
Heating mode direct selection.
- **AUTO Button**
Auto mode direct selection.
- **COOLING Button**
Cooling mode direct selection.
- **TEMPERATURE Button**
Use these buttons to raise or lower the temperature setting.
(Keep pressing and the value will change more quickly.)
- **FAN Button**
This determines the fan speed. Every time you press these buttons, the intensity of circulation will change from " (AUTO) ↔ (HI) ↔ (MED) ↔ (LOW) ↔ (SILENT)" (This button allows selecting the optimal or preferred fan speed for each operation mode.)
- **SLEEP Button**
Use this button to set the sleep timer.
- **TWO WAY AIR EXCHANGE Button**
Press this button to start the two way air exchange mode.

- 8 -



- **SELF CLEAN Button**
  Use this button to set the self clean mode.
- **AUTOMATIC TWO WAY AIR EXCHANGE Button**
  Press this button to set the automatic two way air exchange mode.
- **AIR PURIFIER Button**
  Press this button to start the air purifier mode.
- **FAN SPEED Selector**
  This determines the fan speed. Every time you press this button, the intensity of circulation will change from " (AUTO) ➔ (HI) ➔ (MED) ➔ (LOW) ➔ (SILENT)" cyclically.
- **FUNCTION Selector**
  Use this button to select the operating mode. Every time you press this button, the mode will change from " (AUTO) ➔ (HEAT) ➔ (DEHUMIDIFY) ➔ (COOL) ➔ (FAN)" cyclically.
- **AUTO SWING Button**
  Controls the angle of the horizontal air deflector.
- **FRESH AIR IN DURING SLEEP MODE Button**
  Use this button to set the fresh air in during sleep mode.
- **RESERVE Button**…Time setting reservation.
- **CANCEL Button**…Cancel time reservation.
- **TIMER Control**…Use these buttons to set the timer.
- **TIME Button**…Use this button to set and check the time.
- **OFF-TIMER Button** …Select the turn OFF time.
- **ON-TIMER Button** …Select the turn ON time.
- **RESET Button**
  Press this button after the batteries are replaced or when some irregular operation is found.

	AUTO		SLEEPING
	HEAT		STOP (CANCEL)
	DEHUMIDIFY		START (RESERVE)
	COOL		START/STOP
	FAN		TIME
	FAN SPEED: SILENT, LOW, MED, HI		TIMER SET
			TIMER SELECTOR: ON TIMER, OFF TIMER
	TWO WAY AIR EXCHANGE		
	TWO WAY AIR EXCHANGE FAN SPEED: EXHAUST, FRESH AIR IN, HI, MED, LOW		AUTO SWING
			SELF CLEAN
			AUTOMATIC TWO WAY AIR EXCHANGE
	FRESH AIR IN DURING SLEEP MODE		AIR PURIFIER

Precautions for Use
- Do not put the remote controller in the following places.
  - In direct sunlight.
  - In the vicinity of a heater.
- Handle the remote controller carefully. Do not drop it on the floor, and protect it from water.
- Once the outdoor unit stops, it will not restart for about 3 minutes (unless you turn the power switch off and on or unplug the power cord and plug it in again). This is to protect the device and does not indicate a failure.
- If you press the FUNCTION selector button during operation, the device may stop for about 3 minutes for protection.

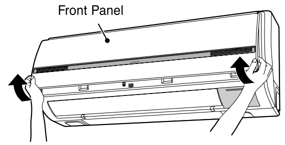
ENGLISH

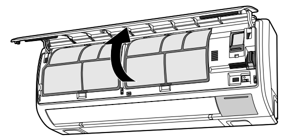
INSTALLING AND VERIFYING THE AIR PURIFYING FILTER/DUCT FILTER (FRESH AIR IN PRE-FILTER, EXHAUST PRE-FILTER, NANO-TITANIUM DISINFECTING DEODORIZING/DUST COLLECTING FRESH AIR IN FILTER)

■ **Please install the filters after turning off the device with the remote controller.**

1 Open the Front Panel

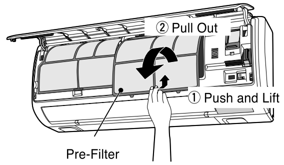
- Hold both sides of the front panel and lift up.





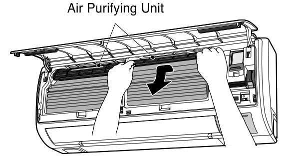
2 Removing the Pre-Filter

- Pull out the pre-filters on the right and left.



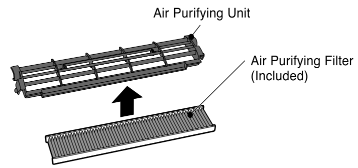
3 Removing the Air Purifying Unit

- Remove the air purifying unit (2 pieces) by pulling out while pushing up with both hands.



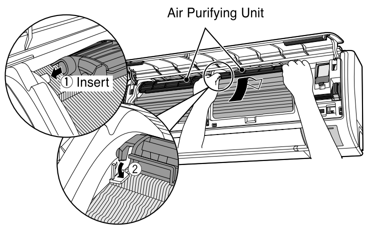
4 Attaching the Air Purifying Filter on the Air Purifying Unit

- Open the air purifying unit and attach the air purifying filter with the jagged side up.



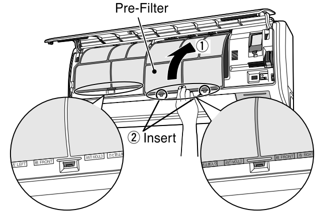
- This filter can be used for about 2 years. Please do not wash this filter. This filter is disposal type.

5 Attaching the Air Purifying Unit



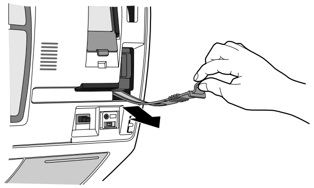
6 Attaching the Pre-Filter

- Please attach the pre-filter with the "FRONT" indication. (The configuration of the left and right pre-filters is different.)



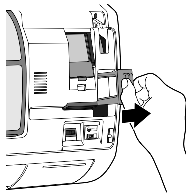
7 Removing the Fresh Air In Pre-Filter

- Please pull out.

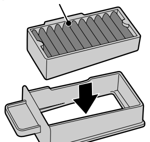


8 Removing the Nano-Titanium Disinfecting Deodorizing/Dust Collecting Fresh Air In Filter Case

- Please hold the handle of the Nano-Titanium Disinfecting Deodorizing/Dust Collecting Fresh Air In Filter Case and pull out.

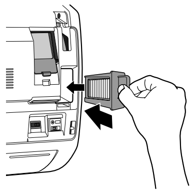


9 Attaching the Nano-Titanium Disinfecting Deodorizing/Dust Collecting Fresh Air In Filter



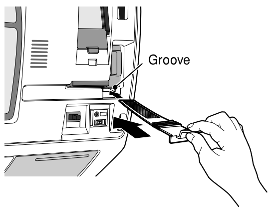
10 Attaching the Nano-Titanium Disinfecting Deodorizing/Dust Collecting Fresh Air In Filter Case

- Please hold the handle of the case and attach along the slot, and then keep pressing until the case clicks.
- Improper filter installation may result in abnormal noises.



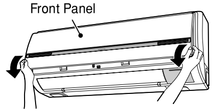
11 Attaching the Fresh Air In Pre-Filter

- Please hold the handle and install the filter by pushing it along the inner grooves.

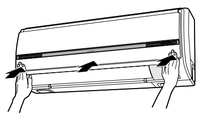


12 Closing the Front Panel

- Hold the front panel with both hands and pull forward, then down.

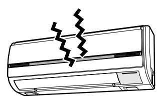


- Keep pressing the front panel in the direction of the arrow (3 places) until the panel clicks.



⚠ CAUTION

- If the front panel is loose, the panel may come off and fall.
- When opening the front panel, please do not use excessive force. If the front panel comes off the device, this may cause it to malfunction.
- Please do not operate the device without the pre-filter. If dust enters the machine, this may cause it to malfunction.
- When removing and installing the pre-filter, please take sufficient care not to cut your hand with the fin of the heat exchanger.



VARIOUS FUNCTIONS

AUTO RESTART CONTROL

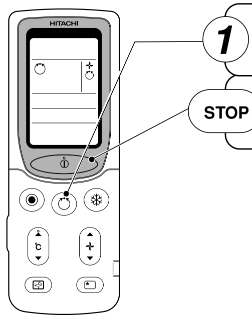
- If there is a power failure, operation will be automatically restarted when the power is resumed with previous operation mode and airflow direction. (As the operation is not stopped by remote controller.)
- If you intend not to continue the operation when the power is resumed, switch off the power supply. When you switch on the circuit breaker, the operation will be automatically restarted with previous operation mode and airflow direction.

Note: 1. If you do not require Auto Restart Control, please consult your sales agent.
2. Auto Restart Control is not available when Timer or Sleep Timer mode is set.

AUTOMATIC OPERATION

The device will automatically determine the mode of operation, HEAT or COOL depending on the initial room temperature. The selected mode of operation will change when the room temperature varies.

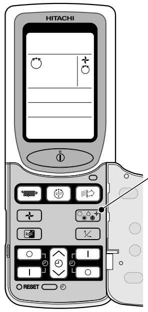
■ **Direct selection**



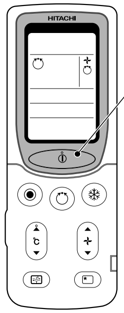
1 Press the ⭮ (AUTO) button. Operation start with a beep at previous AUTO mode.

STOP Press the ⏻ (START/STOP) button.

■ Manual selection



1. Press the FUNCTION selector so that the display indicates the ↻ (AUTO) mode of operation.
   - When AUTO has been selected, the device will automatically determine the mode of operation, HEAT or COOL depending on the current room temperature.
   - When AUTO is first selected, the device will determine the current room temperature and select the proper operation mode accordingly.
   - When the air conditioner has adjusted the room's temperature to the near preset temperature, it will begin to monitor operation. If the room temperature subsequently changes, the air conditioner will once again select the appropriate operation (heating or cooling) to adjust the temperature to the preset temperature. The monitoring operation range is ±3°C relative to the preset temperature.
   - If the mode automatically selected by the unit is not satisfactory, manually change the mode setting (heat, dehumidify, cool or fan).



START/STOP: Press the ⏻ (START/STOP) button.
Operation starts with a beep.
Press the button again to stop operation.

■ As the settings are stored in memory in the remote controller, you only have to press the ⏻ (START/STOP) button next time.

You can raise or lower the temperature setting as necessary by maximum of 3°C.

Press the temperature button and the temperature setting will change by 1°C each time.

- The preset temperature and the actual room temperature may vary somewhat depending on conditions.

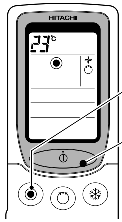
Press the ✢ (FAN SPEED) button to select AUTO, LOW and SILENT.

ENGLISH

HEATING OPERATION

- Use the device for heating when the outdoor temperature is under 21°C. When it is too warm (over 21°C), the heating function may not work in order to protect the device.
- In order to keep reliability of the device, please use this device above -15°C of the outdoor temperature.

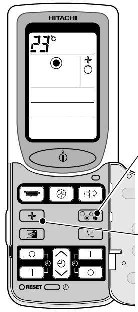
■ Direct selection



1. Press the ◉ (HEAT) button. Operation start with a beep at previous HEAT mode.

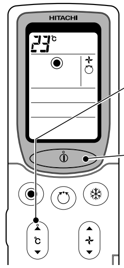
STOP: Press the ⏻ (START/STOP) button.

■ Manual selection



1. Press the FUNCTION selector so that the display indicates ◉ (HEAT).
2. Set the desired FAN SPEED with the ✢ (FAN SPEED) button (the display indicates the setting).

↻ (AUTO)	:	The FAN SPEED changes automatically according to the temperature of the air which blows out.
(HI)	:	Economical as the room will become warm quickly. But you may feel a chill at the beginning.
(MED)	:	Quiet.
(LOW)	:	More quiet.
(SILENT)	:	Silent.



3. Set the desired room temperature with the TEMPERATURE buttons (the display indicates the setting).
   The temperature setting and the actual room temperature may vary somewhat depending on conditions.

START/STOP: Press the ⏻ (START/STOP) button.
Heating operation starts with a beep.
Press the button again to stop operation.

■ As the settings are stored in memory in the remote controller, you only have to press the ⏻ (START/STOP) button next time.

DEFROSTING

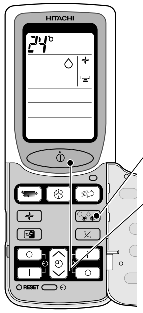
Defrosting will be performed about once an hour when frost forms on the heat exchange of the outdoor unit, for 5~10 minutes each time.

During defrosting operation, the operation lamp blinks in cycle of 3 seconds on and 0.5 second off. The maximum time for defrosting is 20 minutes. (If the piping length used is longer than usual, frost will likely to form.)

ENGLISH

DEHUMIDIFYING OPERATION

Use the device for dehumidifying when the room temperature is over 16°C. When it is under 15°C, the dehumidifying function will not work.



1 Press the FUNCTION selector so that the display indicates (DEHUMIDIFY).
Press the (FAN SPEED) button to select LOW and SILENT.

START/STOP Press the (START/STOP) button.

- ■ When you want to change the operation mode, please use the FUNCTION selector.
- ■ Set the desired temperature is available.
- ■ You also can use the FUNCTION selector to select this operation.

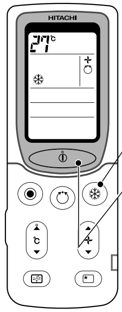
DEHUMIDIFYING FUNCTION

- Dehumidifying takes place with a target temperature which is slightly lower than the room temperature setting. (However, target temperature is 16°C for a temperature setting of 16°C.) If the room temperature becomes lower than the target value, operation stops. If the room temperature becomes higher than the target value, operation restarts.
- The preset room temperature may not be reached depending on the number of people present in the room conditions.

COOLING OPERATION

Use the device for cooling when the outdoor temperature is -10 to 42°C.
If humidity is very high (over 80%) indoors, some dew may form on the air outlet grill of the indoor unit.

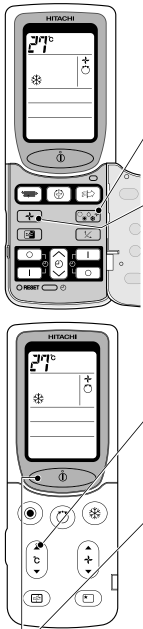
■ Direct selection



1 Press the (COOL) button. Operation start with a beep at previous COOL mode.

STOP Press the (START/STOP) button.

■ Manual selection



1 Press the FUNCTION selector so that the display indicates (COOL).

2 Set the desired FAN SPEED with the (FAN SPEED) button (the display indicates the setting).

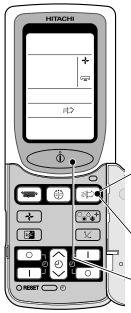
(AUTO)	: The FAN SPEED is HI at first and varies to MED automatically when the preset temperature has been reached.
(HI)	: Economical as the room will become cool quickly.
(MED)	: Quiet.
(LOW)	: More quiet.
(SILENT)	: Silent.

3 Set the desired room temperature with the TEMPERATURE buttons (the display indicates the setting).
The temperature setting and the actual room temperature may vary somewhat depending on conditions.

START/STOP Press the (START/STOP) button. Cooling operation starts with a beep. Press the button again to stop operation. The cooling function does not start if the temperature setting is higher than the current room temperature (even though the (OPERATION) lamp lights).
The cooling function will start as soon as you set the temperature below the current room temperature.

■ As the settings are stored in memory in the remote controller, you only have to press the (START/STOP) button next time.

AIR PURIFIER OPERATION (FAN)



1 The air purifier is operated by pressing the (AIR PURIFIER) button.

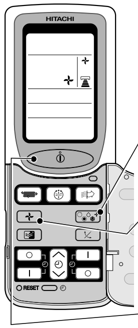
- The device beeps when it has received the signal and then the air purifier starts.
- The OPERATION lamp on the indoor unit indicators turn on.
- The fan speed can be changed as desired.
  Either HI, MED, LOW or SILENT can be selected.

The power of the air purifier is increased by increasing the speed of the air conditioner's fan, by pressing the (AIR PURIFIER) button while the HEAT, COOL or DEHUMIDIFY operates.
(Depending on the operation conditions, there is a case that the fan speed does not increase.)

STOP / CANCEL Press the (START/STOP) button to stop operation.
Press the (AIR PURIFIER) button again to cancel the air purifier operation.
(During HEAT, COOL or DEHUMIDIFY operation)

FAN OPERATION

You can use the device simply as an air circulator. Use this function to dry the interior of the indoor unit at the end of summer.



1 Press the FUNCTION selector so that the display indicates (FAN).

2 Press the (FAN SPEED) button.

(HI)	:	The strongest air blow.
(MED)	:	Quiet.
(LOW)	:	More quiet.
(SILENT)	:	Silent

START / STOP Press the (START/STOP) button.
Fan operation starts with a beep.
Press the button again to stop operation.

FAN SPEED (AUTO) …When the AUTO fan speed mode is set in the cooling/heating operation:

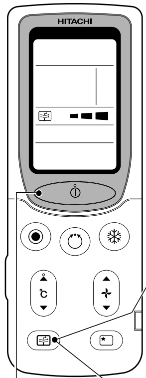
For the heating operation	• The fan speed will automatically change according to the temperature of discharged air. • As room temperature reaches the preset temperature, a very light breeze will blow.
For the cooling operation	• Operation starts in the "HI" mode to reach the preset temperature. • As room temperature approaches the preset temperature, fan speed automatically switches to "LOW".

ENGLISH

TWO WAY AIR EXCHANGE OPERATION

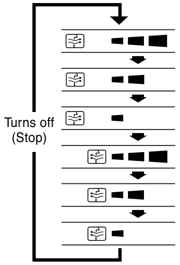
(Please refer to page 32, Understanding The Operating Mechanism)

- Operate the fresh air in and exhaust by operating the two way air exchange fan.
- The fresh air in and exhaust can be operated in combination by configuring the Two Way Air Exchange Operation while the air conditioning operates.
- The fresh air in and exhaust cannot be operated simultaneously.



1 Press the button.

- The device beeps when it has received the signal and the two way air exchange starts. By pressing the button, the display changes as on the right.
- The OPERATION and the "Two Way Air Exchange" lamps on the indoor unit indicators turns on.
- Although the ventilated air is deodorized by the Nano-Titanium Disinfecting Deodorizing/Dust Collecting Fresh Air In Filter, the odor of the ventilated air may enter the room according to the environment where the filter is utilized. If there is concern regarding any odors, please stop the device.
- Operate the exhaust for about 10 minutes every 2 hours during fresh air in to prevent dew condensation on the two way air exchange fan and hose and to prevent dust from plugging the hose.
- It is recommended that the self clean operation is configured to dry the inside of the two way air exchange hose (Refer page 30).



STOP Press the (START/STOP) button.
Press the button. Until Fresh Air In or Exhaust on the remote controller turns off. (During HEAT, COOL and DEHUMIDIFY operation)

⚠ WARNING

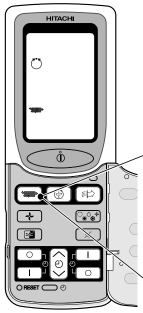
- If the fresh air in/exhaust function is insufficient when the air conditioning is utilized in a sealed room or simultaneously with a heating appliance, open a window often or ventilate with a ventilating fan.
- If ventilation is insufficient, oxygen deficiency may cause asphyxiation.
- **When the humidity inside the room is HIGH (more than 70%), do not use the fresh air in operation.** Dew condensation may be the cause of failure.

ENGLISH

SELF CLEAN OPERATION

(Please refer to page 34, Understanding The Operating Mechanism)

- By configuring Self Clean operation, once cooling and dehumidifying operation are performed, the device automatically performs Self Clean operation suppressing the outbreak of mold. (This does not eliminate the presence of mold or have a bactericidal effect.)
- As this operation cause the two way air exchange fan and hose dry, it is recommended that to set Self Clean operation when utilizing the fresh air in operation (Refer page 18).



1 Press the (SELF CLEAN) button.

- The device beeps when it has received the signal and the (SELF CLEAN) button on the remote controller turns on.
- The "SELF CLEAN" lamp on the indoor unit indicators turns on.
- This operates for about one hour and automatically stops.
- The "OPERATION" lamp on the indoor unit indicators turns on during the self clean operation and then the "SELF CLEAN" lamp blinks. (When drying the two way air exchange fan and hose operation is performed, the "TWO WAY AIR EXCHANGE" lamp also turns on.)
- When cooling and dehumidifying operation are performed for a short time (less than 1 hr.), the Self Clean operation does not perform.

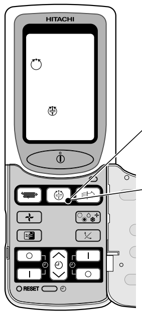
CANCEL To cancel, press the (SELF CLEAN) button again.

- The (SELF CLEAN) button on the remote controller turns off.
- The "SELF CLEAN" lamp on the indoor unit indicators turns off.

AUTOMATIC TWO WAY AIR EXCHANGE OPERATION

(Please refer to page 34, Understanding The Operating Mechanism)

- By configuring the Automatic Two Way Air Exchange, the "Dirt Sensor" detects the dust in the room's air. If the air is dirty, the air conditioning automatically operates the blower and exhaust and when the air becomes clean, the Fresh Air In is operated.
- When the prohibit Two Way Air Exchange is selected with the Two Way Air Exchange Selection Switch (Refer page 6), please do not configure the Automatic Two Way Air Exchange. Aside from ①, the remote controller is not able to configure any other settings.
- If Fresh Air In or Exhaust is operated using the button during Automatic Two Way Air Exchange Set, Fresh Air In or Exhaust Operation perform in the priority.



1 Press the button.

- The device beeps when it has received the signal and the on the remote controller turns on.
- The "TWO WAY AIR EXCHANGE" lamp on the indoor unit indicators turns on.

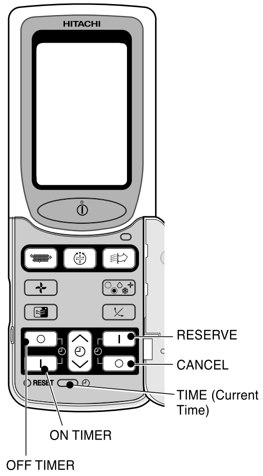
CANCEL To cancel, press the button again.

- The on the remote controller turns off.
- The "TWO WAY AIR EXCHANGE" lamp on the indoor unit indicators turns off.

⚠ CAUTION

- Exhaust operation may not perform in Automatic Two Way Air Exchange Operation when the air inside the room is dirt.
  In this case, please operate Exhaust operation manually by pressing the (Two Way Air Exchange) button or open the windows for ventilation.

HOW TO SET THE TIMER



Time

After you change the batteries:

1 Set the current time with the TIMER control button.

AM PM 18:88 ▶ ➡ PM 1:30

Example: The current time is P.M.1:30.

OFF-Timer

Start ➡ Stop

You can set the device to turn off at the present time.

1 Press the ○ (OFF-TIMER) button. The ○ (OFF) mark blinks on the display.

▶ ➡ AM 0:00

ON-Timer

Stop ➡ Start

The device will turn on at the designated times.

1 Press the I (ON-TIMER) button. The I (ON) mark blinks on the display.

▶ ➡ AM 6:00

ON/OFF-Timer

Start ⇄ Stop

- The device will turn on (off) and off (on) at the designated times.
- The switching occurs first at the preset time that comes earlier.
- The arrow mark appearing on the display indicates the sequence of switching operations.

1 Press the ○ (OFF-TIMER) button so that the ○ (OFF) mark blinks.

2 Set the turn-off time with the TIMER control button. Press the I (RESERVE) button.

3 Press the I (ON-TIMER) button so that the ○ (OFF) mark lights and the I (ON) mark blinks.

▶ ➡ PM 0:00 ▶ ➡ PM 10:30 ▶ ➡ PM 10:30 AM 6:00

How to Cancel Reservation

Point the signal window of the remote controller toward the indoor unit, and press the ○ (CANCEL) button.
The (RESERVED) sign goes out with a beep and the (TIMER) lamp on the indoor unit indicators turns off.

NOTE

You can set only one of the OFF-timer, ON-timer and ON/OFF-timer.

2 Press the ⏲ (TIME) button. The time indication starts lighting instead of blinking.

- The time indication will disappear automatically in 10 seconds.
- To check the current time setting, press the ⏲ (TIME) button twice. The setting of the current time is now complete.

2 Set the turn-off time with the TIMER control button.

3 Point the signal window of the remote controller toward the indoor unit, and press the I (RESERVE) button.
The ○ (OFF) mark starts lighting instead of blinking and the ⏲ (RESERVED) sign lights. A beep occurs and the ⏲ (TIMER) lamp lights on the indoor unit.

Example:
The device will turn off at P.M.11:00.
The setting of turn-off time is now complete.

2 Set the turn-on time with the TIMER control button.

3 Point the signal window of the remote controller toward the indoor unit, and press the I (RESERVE) button.
The I (ON) mark starts lighting instead of blinking and the ⏲ (RESERVED) sign lights. A beep occurs and the ⏲ (TIMER) lamp lights on the indoor unit.

Example:
The device will turn on early so that the preset temperature be almost reached at A.M.7:00.
The setting of the turn-on time is now complete.

4 Set the turn-on time with the TIMER control button.

5 Point the signal window of the remote controller toward the indoor unit, and press the I (RESERVE) button.
The I (ON) mark starts lighting instead of blinking and the ⏲ (RESERVED) sign lights. A beep occurs and the ⏲ (TIMER) lamp lights on the indoor unit.

Example:
For heating, the device will turn off at P.M.10:30, and then turn on early so that the preset temperature be almost reached at A.M.7:00; for cooling and dehumidifying, it will simply turned on at A.M.7:00. The settings of the turn on/off times are now complete.

- The timer may be used in three ways: off-timer, on-timer and ON/OFF (OFF/ON)-timer. Set the current time at first because it serves as a reference.
- As the time settings are stored in memory in the remote controller, you only have to press the I (RESERVE) button in order to use the same settings next time.

ENGLISH

HOW TO SET THE SLEEP TIMER

- The “Off Timer”, used exclusively when sleeping, stops the fan after a specified time after configuring the “Fan Speed” appropriate before going to bed, when cooling with the air conditioning.
- The “Off Timer” stops the individual operation of the fresh air in, exhaust and air purifier after a specified time.



1

- By pressing the [*] (SLEEP) button, the desired sleep time can be selected (1 hr., 2 hrs., 3 hrs. or 7 hrs. Monitoring).
- The Sleep (7 hrs. Monitoring) operation momentarily stops cooling/dehumidifying after operating for three hours and then the room’s temperature is monitored for the next 4 hrs..
While the room is monitored, the device automatically operates/stops repeatedly (One Hour More Timer) according to the conditions of the room.
- The Sleep (7 hrs. Monitoring) operation momentarily stops heating after operating for three hours and then the room’s temperature is monitored for the next 4 hrs.. When the room temperature falls by 4-5°C, the device restarts to maintain the temperature.

2

- By pressing the [*] (SLEEP) button, the display changes as follows.

1 hr. Operation → 2 hrs. Operation → 3 hrs. Operation → Sleep (7 hrs. Monitoring) → Canceling the Sleep Timer → 1 hr. Operation

- The device beeps when it has received the signal and the Sleep operation starts. The specified Sleep Timer and the stop operation time are displayed in the display of the remote controller.
- The timer lamp of the indoor device turns on when configuring the Sleep Timer.
- The fan speed during the Sleep operation is set at silent.
- The Sleep Timer settings of the fresh air in, exhaust and the air purifier are 1, 2, 3 and 7 hrs..

Sleep timer → Start: The device will be turned off by the sleep timer and turned on by on-timer.

1 Set the ON-timer.

2 Press the [*] (SLEEP) button and set the sleep timer.

Example: For heating:
In this case, the device will turn off in 2 hrs. (at A.M.1:38) and turn on early so that the preset temperature will be almost reached at A.M.6:00 next morning.

How to Cancel Reservation

Point the signal window of the remote controller toward the indoor unit, and press the ○ (CANCEL) button.
The ⏲ (RESERVED) sign goes out with a beep and the ⏲ (TIMER) lamp on the indoor unit indicators turns off.

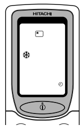
NOTE If you set the sleep timer when the off-time or on/off-timer has been set earlier, the sleep timer becomes effective instead of the off - or on/off-timer set earlier.

ENGLISH

Specifications of the One Hour More Timer

- Even after the 1, 2 or 3 hrs. Sleep Timer has expired when cooling/dehumidifying, this function monitors the room's temperature and automatically operates and stops (1 hr. more timer operation) one more time according to the condition of the room (monitoring time is a maximum of 4 hrs. after the timer expires).

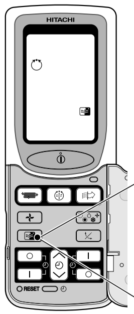
Cooling, Dehumidifying	If the room temperature rises by 2°C, the device operates for 1 hr..



- The timer lamp of the indoor unit turns on while the room's temperature is monitored after the 1, 2 or 3 hrs. timer expires and the [*] and ⏲ on the remote controller turn on.

FRESH AIR IN DURING SLEEP MODE OPERATION

By configuring the "Fresh Air In During Sleep Mode", a fresh air in operation of blowing outside air into the room is added during the "Sleep Timer" operation (page 22) while cooling/dehumidifying. (This cannot be configured when heating operation.)



1

Press the [ ] button.

- The device beeps when it has received the signal and the [ ] on the remote controller turns on.
- If the Fresh Air In During Sleep Mode is configured and set while the air conditioning is stopped, the Fresh Air In During Sleep Mode does not operate. When Sleep is operated while cooling/dehumidifying, the air conditioning automatically operates the "Fresh Air In During Sleep Mode".
- The "Two Way Air Exchange" lamp on the indoor unit indicators turns on during Fresh Air In operating.
- Even after the Sleep Timer of the air conditioning expires, the room temperature and the outside temperature are monitored, while the One Hour More Timer operates and monitors (page 23). If the outside temperature is cooler than room temperature, the Fresh Air In operates.

CANCEL

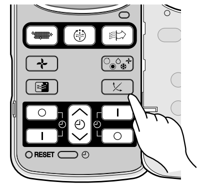
To cancel, press the [ ] button again.

- The [ ] on the remote controller turns off.

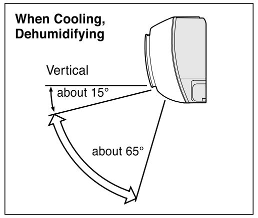
ADJUSTING THE AIR DEFLECTORS

1 Adjustment of the conditioned air in the upward and downward directions.

The horizontal air deflector is automatically set to the proper angle suitable for each operation. The deflector can be swing up and down continuously and also set to the desired angle using the "[ ] (AUTO SWING)" button.

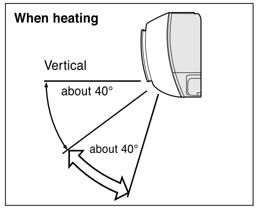


- If the "[ ] (AUTO SWING)" button is pressed once, the horizontal air deflector swings up and down. If the button is pressed again, the deflector stops in its current position. Several seconds (about 6 seconds) may be required before the deflector starts to move.
- Use the horizontal air deflector within the adjusting range shown in the right.
- When the operation is stopped, the horizontal air deflector moves and stops at the position where the air closes.



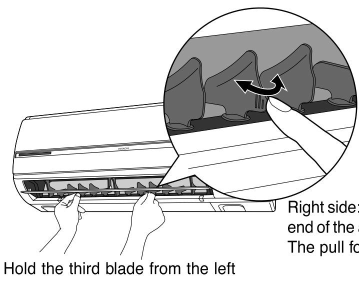
⚠ CAUTION

- In "Cooling" operation, do not keep the horizontal air deflector swinging for a long time. Some dew may form on the horizontal air deflector and dew may drop.



2 Adjustment of the conditioned air to the left and right.

Hold the vertical air deflector as shown in the figure and adjust the conditioned air to the left and right.



Right side: Hold the third blade from the right end of the air deflector to adjust the direction. The pull for the blade is marked.

Left side: Hold the third blade from the left end of the air deflector to adjust the direction. The pull for the blade is marked.

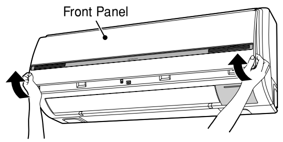
MAINTENANCE

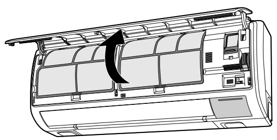
- **It is recommended to carry out deep cleaning of the two way air exchange duct filters (Fresh Air In Pre-Filter, Exhaust Pre-Filter, Nano-Titanium Disinfecting Deodorizing/Dust Collecting Fresh Air In Filter) regularly.**
- **Cleanliness of filters differs according to environment and usage conditions. Check regularly and if the filters are dirty, cleaning is recommended. Especially if the Fresh Air In operation is utilized often, check the filters once every 2 weeks and if the filter is dirty, cleaning is recommended.**

  Although small insects may be caught in the Fresh Air In Pre-Filter, they have entered from the outside air (outside the room) and it is not uncommon. Please wash the Fresh Air In Pre-Filter.

1 Opening the Front Panel

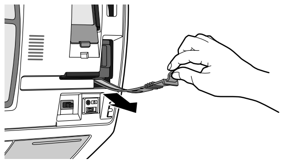
- Hold both sides of the front panel and lift up.





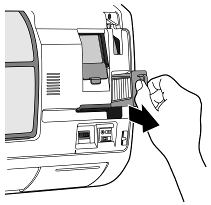
2 Removing the Fresh Air In Pre-Filter

- Please pull out to the front.



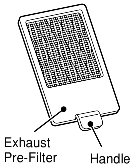
3 Removing the Nano-Titanium Disinfecting Deodorizing/Dust Collecting Fresh Air In Filter Case

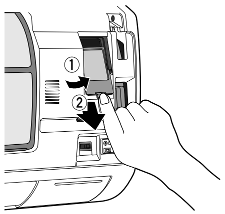
- Please hold the handle of the Nano-Titanium Disinfecting Deodorizing/Dust Collecting Fresh Air In Filter Case and pull out to the front.



4 Removing the Exhaust Pre-Filter

- Please remove by pushing up the handle ① and then pulling ②.





5 Confirm the Dirt on Each of the Removed Filters

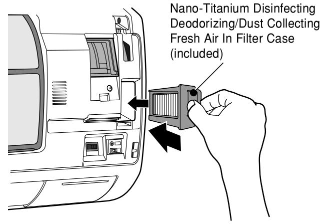
- Please proceed to ⑦ if the filter is not dirty.

6 Wash Each of the Removed Filters with Water

- After washing with water, please allow to drip dry.
- If the dirt is difficult to wash off, please wash with luke warm water that does not exceed 40°C.
- Do not rub too hard when washing with water.
- Nano-Titanium Disinfecting Deodorizing/Dust Collecting Fresh Air In Filter should wash and dry in the shade once in every 3 months. Although it can be washed and used repeatedly, it is recommended that the filter is replaced every 3 years.

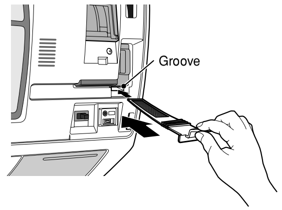
7 Attaching the Nano-Titanium Disinfecting Deodorizing/Dust Collecting Fresh Air In Filter Case

- Improper filter installation may result in abnormal noises.



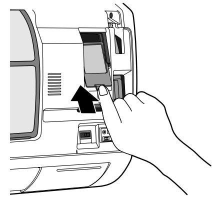
8 Attaching the Fresh Air In Pre-Filter

- Please keep the engraved mark up and attach by pushing the filter into the device until the filter clicks.
- Improper filter installation may result in abnormal noises.



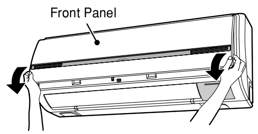
9 Attaching the Exhaust Pre-Filter

- Please hold the handle and attach the filter by pushing it along the inner grooves until the filter clicks.

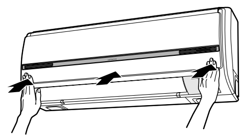


10 Close the Front Panel

- Hold the front panel with both hands and pull forward, then down.



- Keep pressing the front panel in the direction of the arrow (3 places) until the panel clicks with both hands and pull forward, then down.



⚠ CAUTION

- **Do not operate with the duct filter removed.**
  Dust or odors may infiltrate the room and may cause the device to malfunction.

⚠ CAUTION

Cleaning and maintenance must be carried out only by qualified service personal. Before cleaning, stop operation and switch off the power supply.

1. PRE-FILTER

When the filter indicator lamp comes on, be sure to clean the filter. By doing so, the power rates are saved. In case the air filter is full of dust, the air flow will decrease and the cooling capacity will be reduced. Further, noise may occur. Be sure to clean the filter following the procedure below.

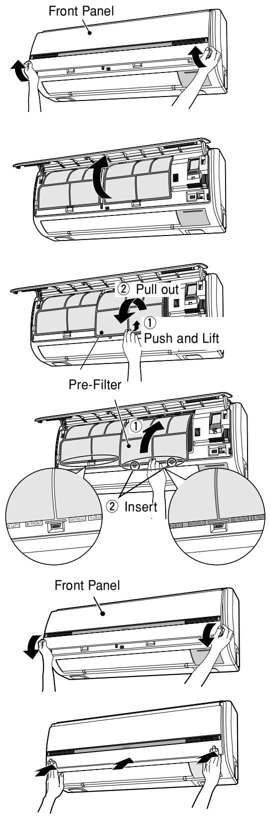
PROCEDURE

1 Open the front panel carefully and remove the filter.

2 Vacuum dust from the pre-filter using vacuum cleaner. If there is too much dust, wash the filter with detergent and rinse it thoroughly. After that, dry it in the shade.



3
- Set the filter with "FRONT" mark facing front, and slot them into the original state.
- After attaching the filters, push the front panel at three arrow portions as shown in figure and close it.

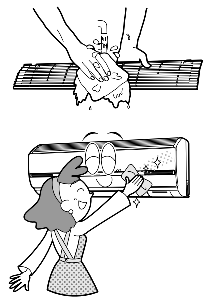


⚠ CAUTION

- Do not wash with hot water at more than 40°C. The filter may shrink.
- When washing it, shake off moisture completely and dry it in the shade; do not expose it directly to the sun. The filter may shrink.
- Don't operate the unit without filter. Fault may occur if you continue.

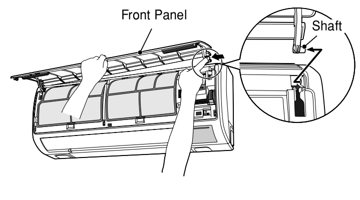
2. CLEANING OF FRONT PANEL AND TOP GRILL

- Remove the front panel and the top grill and wash with clean water.
  Wash it with a soft sponge.
  After using neutral detergent, wash thoroughly with clean water.
- When the front panel and the top grill are not removed, wipe it with a soft dry cloth. Wipe the remote controller thoroughly with a soft dry cloth.
- Wipe the water thoroughly.
  If water remains at indicators or signal receiver of indoor unit, it causes trouble.



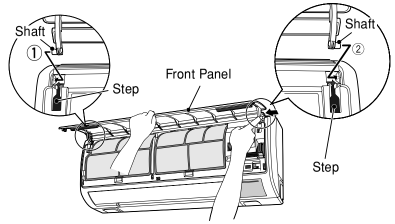
Method of removing the front panel
Be sure to hold the front panel with both hands to detach and attach it.

Removing the Front Panel



- When the front panel is fully opened with both hands, push the right arm to the inside to release it, and while closing the front panel slightly, put it out forward.

Attaching the Front Panel

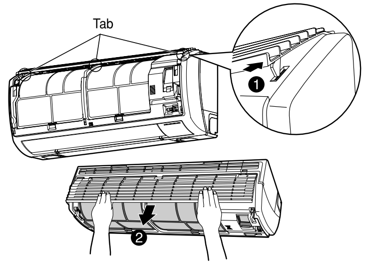


- Move the shafts of the left and right arms into the steps in the unit and securely insert them into the holes.

Removing and attaching the top grill

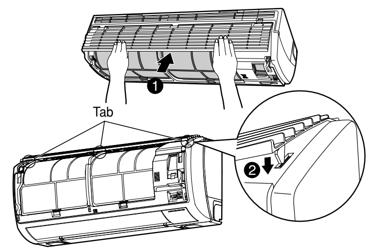
Removing

① Lift up while pressing the top grill and remove from tab. (3 places: left, centre and right)
② Pull forward.



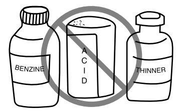
Attaching

① Position the "⇧" sign away. Slide along the top of the indoor device and press.
② Press the top grill down and affix with the hold down tab.



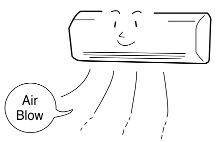
⚠ CAUTION

- Do not splash or direct water to the body of the unit when cleaning it as this may cause short circuit.
- Never use hot water (above 40°C), benzine, gasoline, acid, thinner or a brush, because they will damage the plastic surface and the coating.



3. MAINTENANCE AT BEGINNING OF LONG OFF PERIOD

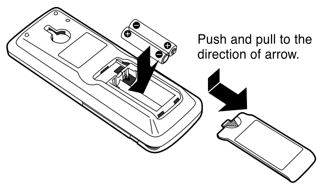
- Run the unit by setting the operation mode to ✢ (FAN) and the fan speed to HI for about half a day on a fine day, and dry the whole of the unit.
- Switch off the power plug or turn off the circuit breaker.



HOW TO EXCHANGE THE BATTERIES IN THE REMOTE CONTROLLER

1 Remove the cover as shown in the figure and take out the old batteries.

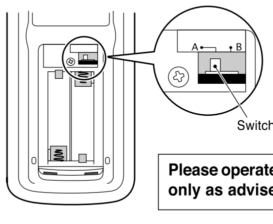
2 Install the new batteries. The direction of the batteries should match the marks in the case.



⚠ CAUTION

1. Do not use new and old batteries, or different kinds of batteries together.
2. Take out the batteries when you do not use the remote controller for 2 or 3 months.

Address Changing Switch



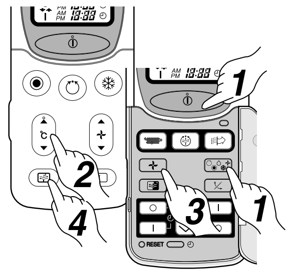
Please operate this switch only as advised.

✻ The Address Changing Switch is utilized to avoid interference between remote controllers when there are two indoor units mounted in the same room and is normally not utilized.
(When the device is shipped out of the factory, it is set to “A”.)
Furthermore, please ask the dealer where the device was purchased, how the device is configured.

ENGLISH

MAINTENANCE(Two Way Air Exchange Fan and Hose)

■ **To ensure clean usage, please dry the interior of the Two Way Air Exchange Fan and Hose.**
- If this is the first time during the year (seasons) that the device is being used to cooling or dehumidifying operation, please conduct one of the following maintenance procedures.
- If this is the first time during the year (seasons) that the device is being used to heat, please conduct one of the following maintenance procedures.
- If odors from the fresh air window are a concern, even if maintenance has been conducted on the duct filters, please conduct one of the following maintenance procedures.

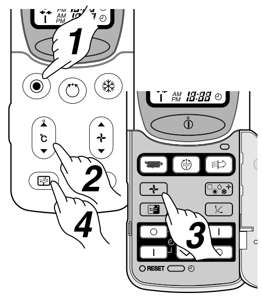


Maintenance During the Summer

- After sealing the room, please conduct the following for 4 hrs..

1 **Please perform dehumidify operation.**
2 **Please set the temperature to 24°C.**
3 **Please set the fan speed to “SILENT”.**
4 **Please perform the exhaust (HI) operation.**

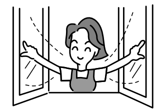




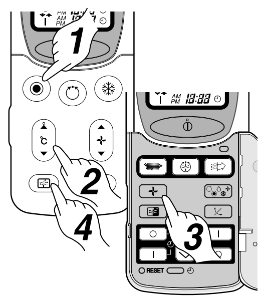
Maintenance During the Autumn or Rainy Season

- After opening the room, please conduct the following for 4 hrs..

1 **Please perform heat operation.**
2 **Please set the temperature to 32°C.**
3 **Please set the fan speed to “SILENT”.**
4 **Please perform the exhaust (HI) operation.**



- If the outside temperature is above 24°C, please conduct maintenance by following the “Maintenance During the Summer” procedures. (When the outside temperature exceeds 24°C, the machine does not operate the heater to prevent any damage.)



Maintenance During the Winter

- After opening the room, please conduct the following for 4 hrs..

1 **Please perform heat operation.**
2 **Please set the temperature to 32°C.**
3 **Please set the fan speed to “SILENT”.**
4 **Please perform the exhaust (HI) operation.**



INFORMATION

CAPABILITIES

Heating Capability

- This room air conditioner utilizes a heat pump system that absorbs exterior heat and brings it into a room to be heated. As the ambient temperature gets lower, heating capability will also lower. In such a situation, the inverter work to increase compressor rpm to keep the unit's heating capability from decreasing. If the unit's heating performance is still unsatisfactory, other heating appliances should be used to augment this unit's performance.

⚠ CAUTION

Do not use a stove or any other high temperature devices in proximity to the indoor unit.



PROHIBITION

- The air conditioner is designed to heat an entire room so that it may take some time before you feel warm. Timer operation is recommended for effective preheating ahead of the desired time.

Cooling and Dehumidifying Capabilities

- If the heat present in a room exceeds the unit's cooling capacity (for example, if there are many people in the room or other heating appliances are used), the preset room temperature may not be reached.

VARIOUS FUNCTIONS

- When fan speed, room temperature are set with the remote controller before starting manual operation and the buttons are released, the indication of settings will go off in 10 seconds and only the operation mode will be displayed.
- Pressing the button while the unit is in operation will let the protective circuit work so that the unit will not operate for approximately 3 minutes.
- During heating operation, the "OPERATION" lamp on the indoor unit indicators may blink with no air emitted for a while.
- If you feel cold wind during heating operation with the (HI) fan speed or want to make the unit operation quieter after the room is heated, use of (AUTO) setting is recommended.
- With the (LOW), (SILENT) settings, the unit's cooling capacity will lower slightly.
- With the (LOW), (SILENT) settings, the unit's fan speed of heating operation will vary with the operating conditions.

TIMER PROGRAMMING/SLEEP TIMER OPERATION

- When the timer has been programmed, the unit will not operate even if the set time is reached unless the unit receives a signal from the remote controller. Confirm that timer programming is complete (beep) and the TIMER lamp of the indoor unit lights.
- If the (SLEEP) button is pressed while the ON/OFF timer is programmed, the sleep timer takes priority.
- During sleep timer operation, the fan speed sets to (SILENT) regardless of the preset speed. The remote controller display indication will remain unchanged even with the (SILENT) setting.

ENGLISH

UNDERSTANDING THE OPERATING MECHANISM

Air Purifier Operation (Page 17)

- When the two way air exchange operation is configured during the air purifier operation, the fan speed operation (heating, cooling and dehumidifying operation when the heating, cooling and dehumidifying of the device are combined) is combined with the two way air exchange operation.

Two Way Air Exchange Operation (Page 18)

■ **Fresh Air In Operation**

- When the air temperature outside the room is more than about 30°C or less than about 3°C, the fresh air in does not operate to prevent dew condensation on the two way air exchange fan and hose and to save energy.
- If the difference in temperature between the inside and outside of the room is more than about 7°C, the fresh air in does not operate to prevent dew condensation on the two way air exchange fan and hose, while cooling operation.
- If the difference in temperature between the inside and outside of the room is more than about 22°C, the fresh air in does not operate to prevent dew condensation on the two way air exchange fan and hose, while heating operation.
- **When the above mentioned operations have stopped, the "Two Way Air Exchange" lamp on the indoor unit indicators blinks (lights for 10 seconds/light off for 1 second).**

⚠ WARNING

- **When the humidity inside the room is HIGH (more than 70%), do not use the fresh air in operation.**
  Dew condensation may be the cause of failure.

■ **Exhaust Operation**

- When the temperature inside the room is more than about 43°C, the exhaust does not operate to protect the exhaust fan from damage.
- **When the above mentioned operation has stopped, the "Two Way Air Exchange" lamp on the indoor unit indicators blinks (lights for 10 seconds/light off for 1 second).**

■ **Abnormal of Two Way Air Exchange Fan**

- Two Way Air Exchange Fan is abnormal if the "Two Way Air Exchange" lamp of the indoor unit indicators blinks (lights for 4 seconds/light off for 1 second) repeatedly.
  In this case, all the functions can be operated except for the Two Way Air Exchange operation.

■ **Sound of the Two Way Air Exchange Operation**

Type of operation	Operating sound
"HI" Fresh Air In	About the same when cooling (Fan Speed: "HI").
"MED" Fresh Air In	About the same when cooling (Fan Speed: "MED").
"LOW" Fresh Air In	About the same when cooling (Fan Speed: "LOW").
"HI" Exhaust	About the same when cooling (Fan Speed: "HI").
"MED" Exhaust	About the same when cooling (Fan Speed: "MED").
"LOW" Exhaust	About the same when cooling (Fan Speed: "LOW").

✻ These are just rough indications when the fresh air in and exhaust operate independently. In addition, the operating volume of the air conditioning changes according to the mounting conditions.
If the air conditioning operation is configured at the same time, the volume of the operation sound becomes bigger.

Sleep Timer Operation (Page 22)

- If the remote controller never receive the signal when sleep timer is set, it does not start to operate even when reaching the set time. Please confirm the sleep timer setting by the "beep" sound and the "TIMER" lamp on the indoor unit.
- If the vertical deflector are configured to swing while the Sleep Timer is set, it will not swing when 1hr. More Timer operates during cooling/dehumidifying or Sleep (7 hrs. Monitoring) operation during heating.
- When sleep timer setting, if the air conditioning operation (cooling, dehumidifying, heating) is configured in combination with the fresh air in, exhaust and air purifier, 1 hr. More Timer of the cooling and dehumidifying operation or Sleep (7 hrs. Monitoring) timer operation during heating only the air conditioning operation performs.

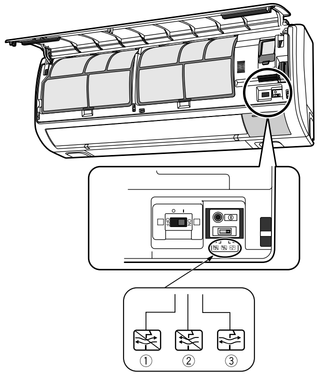
ENGLISH

Fresh Air In During Sleep Mode Operation (Page 23)

- By configuring Fresh Air In During Sleep Mode, the air conditioning operates the fresh air in during sleep mode operation (while cooling or dehumidifying) when the outside air temperature is lower than room temperature.
- If "Sleep Timer" operation of the air purifier is performed while the Fresh Air In During Sleep Mode is configured, ventilating operation that takes the air from the outside into the room air conditioning fan when the outside air temperature is lower than room temperature.
- If the room temperature decreases about 2°C below than configured temperature while fresh air in operating, the fresh air in operation will be stopped.
- The fan speed cannot be adjusted in fresh air in during sleep mode.
- If the heating operation is performed while the Fresh Air In During Sleep Mode is configured, Fresh Air In During Sleep Mode operation will be canceled, however, when the heating operation is stopped, the mode returns to Fresh Air In During Sleep Mode settings.
- If the fresh air in/exhaust operation is performed while the Fresh Air In During Sleep Mode is configured, Fresh Air In During Sleep Mode operation will be canceled, however, when the fresh air in/exhaust operation is stopped, the mode returns to Fresh Air In During Sleep Mode settings.
- The fresh air in does not operate depending on the room temperature/outside air temperature.

Installing the Device when the Two Way Air Exchange Cannot Operate

■ **If the installation work specified for the embedded ducting cannot be vented the two way air exchange hose outside the room, please select "Only Exhaust" or "Prohibit Two Way Air Exchange".**



Two Way Air Exchange Selection Switch
① Prohibit Two Way Air Exchange
② Only Exhaust
③ Operate Two Way Air Exchange

When selecting "Prohibit Two Way Air Exchange"

- When the two way air exchange hose cannot be vented outside of the room directly (installation work specified for the embedded ducting).
- When there is a source of odor, smoke, or oily smoke in the vicinity of the exit of the two way air exchange hose, even if the installation work directly vents the two way air exchange hose outside the room.

When selecting "Only Exhaust" (only exhaust operation can be operated)

- When there is some space to vend the two way air exchange hose between the internal and external walls, which leads outside the room, even if the two way air exchange hose cannot be vented outside of the room directly (conventional construction methods).
- **There is a restriction to the length of the two way air exchange hose (maximum length is 3m).**
- **Please consult your local dealer where the device was purchased regarding the details of installation work.**

⚠ CAUTION

- Do not supply air from inside the wall.
- By supplying highly humid air from inside a wall or from underneath the floor, this will cause dew to form.
- And also may cause the odors from inside a wall or from underneath the floor to infiltrate the room.

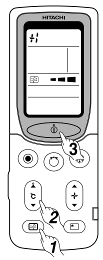
Automatic Two Way Air Exchange Operation

- The Dirt Sensor detects cigarette smoke, sprays (pesticides), alcohol, etc.
- The Dirt Sensor may also respond to sudden temperature changes when the cooling/heating operation starts and sudden changes in airflow when doors open and close.
- The automatic two way air exchange can be configured for two weeks at one time. The (AUTOMATIC TWO WAY AIR EXCHANGE) is configured for two weeks after it is set with the remote controller.
- Even the air in the room is dirty after the automatic two way air exchange operation has been configured, the exhaust operation does not perform for 5 minutes.
- In the case the automatic two way air exchange operation performs during the air conditioning operation, the exhaust or fresh air in operates in addition to the air conditioning.
- Once the dirt sensor detects the dirt and starts exhaust operation, even you open the window after that the exhaust operates for at least 20 minutes and then operates the fresh air in.
- The two way air exchange operation does not perform depending on the room temperature/outside air temperature.

⚠ CAUTION

- Exhaust operation may not perform in Automatic Two Way Air Exchange Operation when the air inside the room is dirt.
  In this case, please operate Exhaust operation manually by pressing the (Two Way Air Exchange) button or open the windows for ventilation.

Changing the Sensitivity of the Dirt Sensor



■ **There are 7 levels of sensitivity**

1 **Press the button while the operation is stopped.**
(Please operate either the fresh air in or the exhaust. Select the fan speed "HI", "MED" or "LOW".)

2 **The sensitivity can be selected with the Room Temperature button.**
sensitivity increase/sensitivity decrease

- Increasing the sensitivity by one level displays "+1".
- Decreasing the sensitivity by one level displays "–1".
- The configuration range has 7 levels: +3 - –3.
- The +3 - –3 display will turn off after about 10 seconds.

3 **Please stop the operation with the button.**

Self Clean Operation (Page 19)

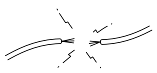
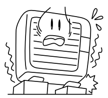
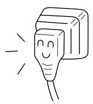
- By setting Self Clean operation, it automatically starts self clean operation after stopping the cooling and dehumidifying operations. First, wash the odor components attached to the indoor heat exchanger due to the "FAN" operation (combined with the exhaust). Next, "HEATING" (combined with the exhaust), "ONLY EXHAUST" and "FAN" operation (combined with the exhaust) are performed to suppress the outbreak of mold in the indoor unit.
- If the outside air temperature is low, the cooling and dehumidifying may not operate.
- If the ON-TIMER has been configured, the Self Clean operation does not perform two hours before the configured time.
- If the operation is stopped in the following conditions, the Self Clean operation does not perform. (Heating and Air purifying operations, stopped by pressing OFF-TIMER or SLEEP TIMER.)

Timer Settings

- If the remote controller never receive the signal when timer is set, it does not start to operate even when reaching the set time. Please confirm the timer setting by the "beep" sound and the "Timer" lamp on the indoor unit.
- When the dehumidifying is operated while the timer is configured, the timer settings will disappear from the LCD, but the setting is not canceled. When the dehumidifying operation is stopped, the timer settings will display again.

REGULAR INSPECTION

PLEASE CHECK THE FOLLOWING POINTS EVERY EITHER HALF YEARLY OR YEARLY. CONTACT YOUR SALES AGENT SHOULD YOU NEED ANY HELP.

1		WARNING	**Check to see if the unit's earth line has been connected correctly.** If the earth line is disconnected or faulty, unit failure or electric shock hazard may result.
2		WARNING	**Check to see if the mounting frame has rusted excessively or if the outdoor unit has tilted or become unstable.** It could collapse or fall, causing injury.
3		WARNING	**Check to see if the power plug is securely inserted into the wall socket.** If the power plug is not inserted into the wall socket securely, it will become hot and an electric shock or fire may occured. If dust or dirt is found on the power plug, clean the plug and insert it into the wall socket.

AFTER SALES SERVICE AND WARRANTY

WHEN ASKING FOR SERVICE, CHECK THE FOLLOWING POINTS.

CONDITION	CHECK THE FOLLOWING POINTS
If the remote controller is not transmitting a signal. (Remote controller display is dim or blank.)	• Do the batteries need replacement? • Is the polarity of the inserted batteries correct?
When it does not operate.	• Is the fuse all right? • Is the voltage extremely high or low? • Is the circuit breaker "ON"? • Is the power plug inserted? • Do you have any power cut?
When it does not cool well. When it does not heat well.	• Is the air filter blocked with dust? • Is the set temperature suitable? • Have horizontal air deflectors been adjusted to their correct positions according to the operation mode selected? • Are the air inlets or air outlets of indoor and outdoor units blocked? • Is the fan speed "LOW" or "SILENT"?

■ The following phenomena do not indicate unit failure.

During heating, the operation indicator blinks and air blow stops	<Operation start> The unit is preparing to blow warm air. Please wait. <In operation> The outdoor unit is defrosting. Please wait.
Hissing or fizzy sounds	Refrigerant flow noise in the pipe or valve sound generated when flow rate is adjusted.
Squeaking noise	Noise generated when the unit expands or contracts due to temperature changes.
Rustling noise	Noise generated with the indoor unit fan's rpm changing such as operation start times.
Clicking noise	Noise of the motorized valve when the unit is switched on.
Perking noise	Noise of the ventilation fan sucking in air present in the drain hose and blowing out dehumidifying water that had accumulated in the condensed water collector. For details, consult your sales agent.
Changing operation noise	Operation noise changes due to power variations according to room temperature changes.
Mist emission	Mist is generated as the air within the room is suddenly cooled by conditioned air.
Steam emitted from the outdoor unit	Water generated during defrosting operation evaporates and steam is emitted.
Odors	Caused as the smells and particles of smoke, food, cosmetics, etc. present in room air become attached the unit and blown off into the room again.
The outdoor unit continues to operate even if operation is stopped.	Defrosting is underway (as the heating operation is stopped, the microcomputer checks frost accumulated in the indoor unit and instructs the unit to perform automatic defrosting if necessary).
The OPERATION lamp is blinking.	Shows preheating or defrosting operation is underway. As the protective circuit or preheat sensor operates when unit operation is stopped during preheating and then restarted, or when operation mode is switched from cooling to heating, the lamp continues to blink.
Does not reach the temperature setting.	Actual room temperature may deviate slightly from the remote controller's temperature setting depending on the number of people in the room, indoor or outdoor conditions when the air conditioner is used for more than one room at the same time.

- If the unit still fails to operate normally after performing the above inspections, turn the circuit breaker off and contact your sales agent immediately.



Contact your sales agent immediately if the following phenomena should occur:
- The circuit breaker switches off or the fuse blows frequently.
- The switch operation is not stable.
- Foreign matter or water accidentally enters the unit interior.
- The power cord gets excessively hot or its insulation is torn or stripped.
- TIMER lamp or FILTER lamp on the indoor unit indicators blinks.
  (As the nature of the failure can be identified by the blinking cycle, check the blinking cycle before turning off the circuit breaker.)



Notes
- In quiet operation or stopping the running, the following phenomena may occasionally occur, but they are not abnormal for the operation.
  (1) Slight flowing noise of refrigerant in the refrigerating cycle.
  (2) Slight rubbing noise from the fan casing which is cooled and then gradually warmed as operation stops.
- The odor will possibly be emitted from the room air conditioner because the various odor, emitted by smoke, foodstuffs, cosmetics and so on, sticks to it. So please clean the air filter and the evaporator regularly to reduce the odor.

- Please contact your sales agent immediately if the air conditioner still fails to operate normally after the above inspections. Inform your agent of the model of your unit, production number, date of installation. Please also inform him regarding the fault.

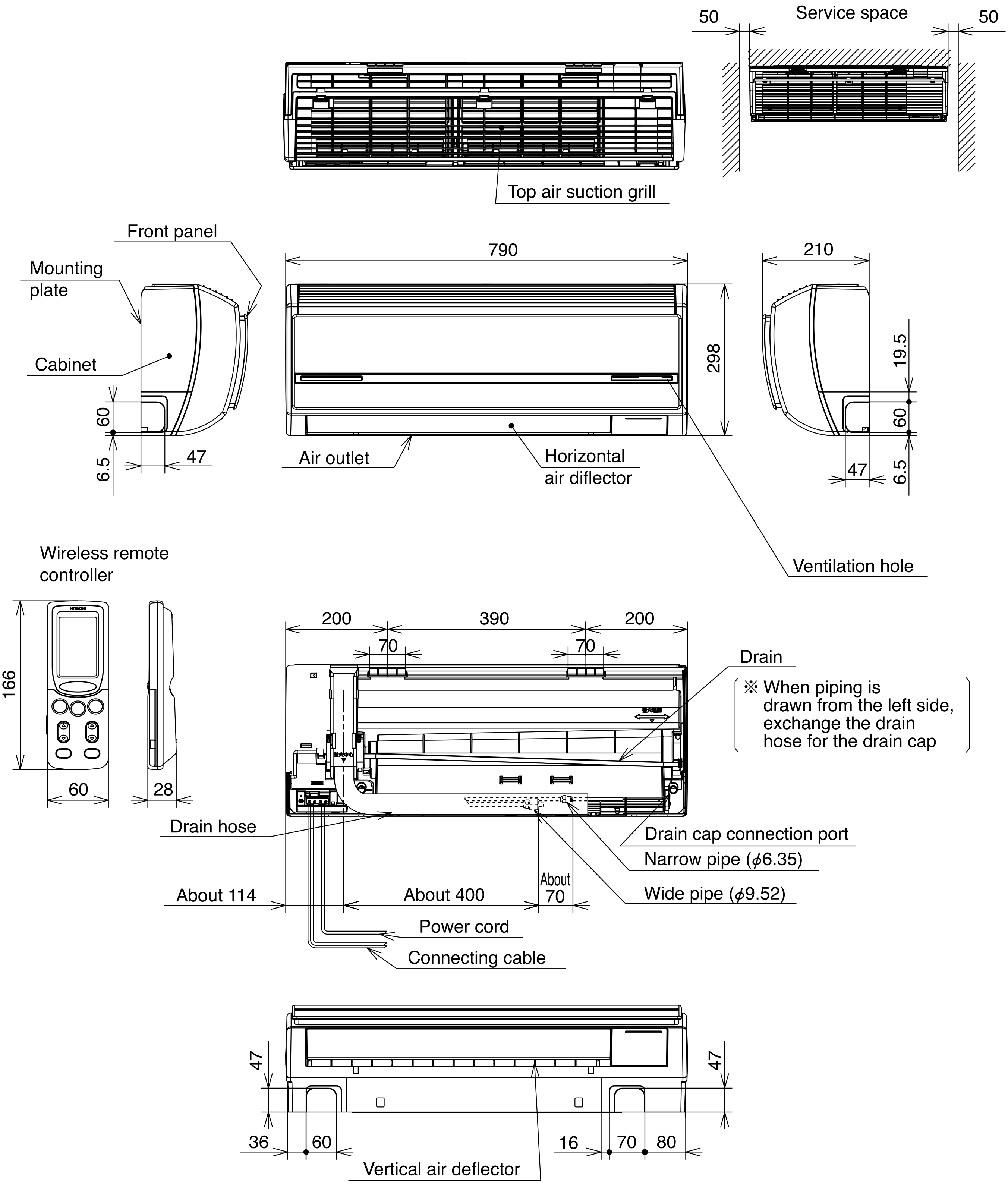
Please note:
On switching on the equipment, particularly when the room light is dimmed, a slight brightness fluctuation may occur. This is of no consequence.
The conditions of the local Power Supply Companies are to be observed.

CONSTRUCTION AND DIMENSIONAL DIAGRAM

MODEL RAS-25JX5, RAS-35JX5

INDOOR UNIT

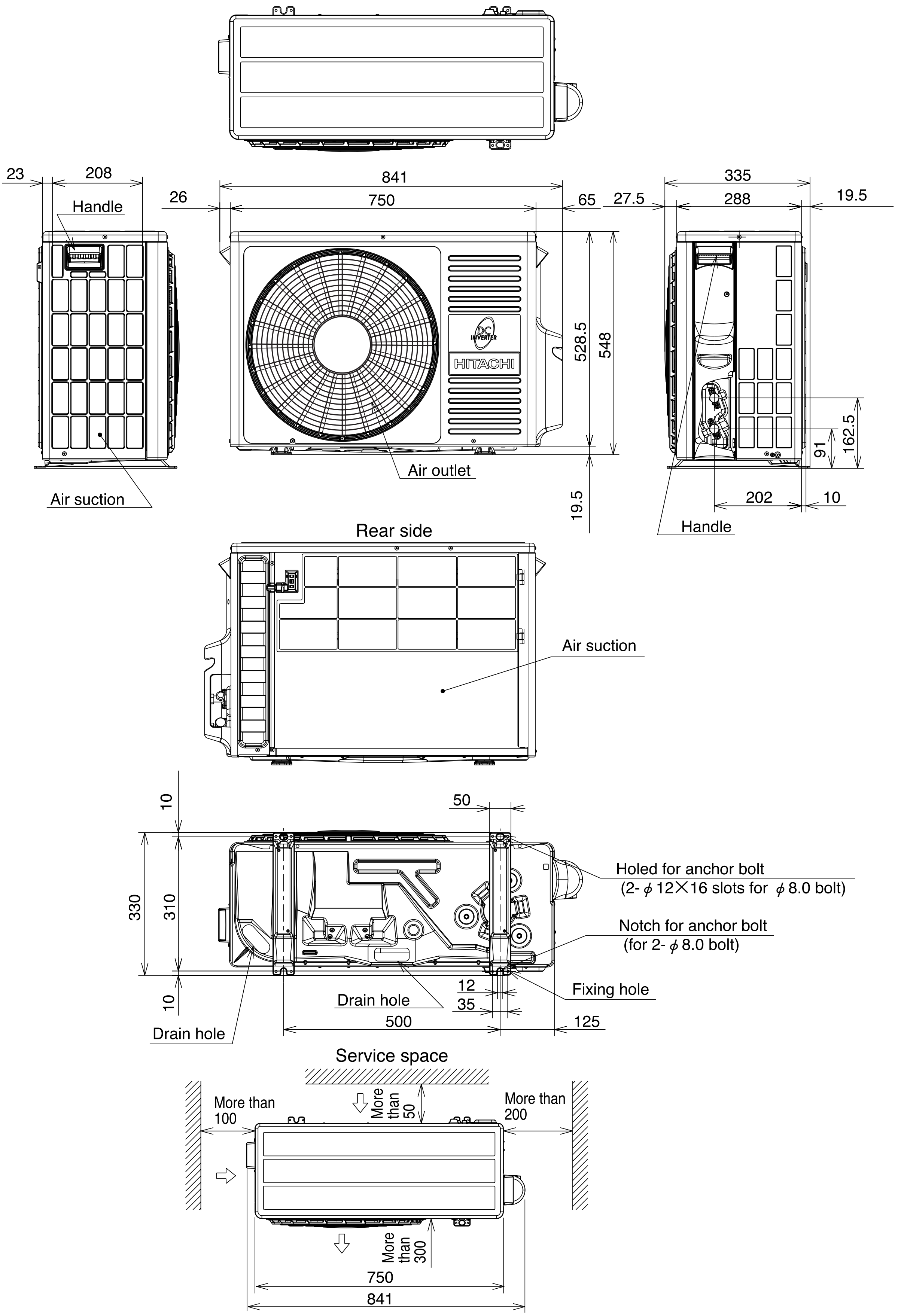
Unit : mm



MODEL RAC-25JX5, RAC-35JX5

OUTDOOR UNIT

Unit : mm



MAIN PARTS COMPONENT

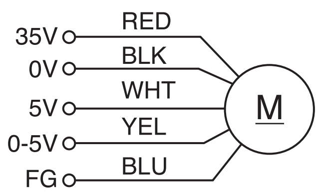
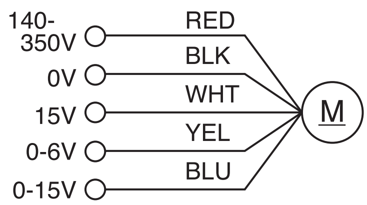
THERMOSTAT

Thermostat Specifications

MODEL			RAS-25JX5, RAS-35JX5	
THERMOSTAT MODEL			IC	
OPERATION MODE			COOL	HEAT
TEMPERATURE ˚C (˚F)	INDICATION 16	ON	16.7 (62.1)	18.7 (65.7)
		OFF	16.0 (60.8)	19.3 (66.7)
	INDICATION 24	ON	24.7 (76.5)	26.7 (80.1)
		OFF	24.0 (75.2)	27.3 (81.1)
	INDICATION 32	ON	32.7 (90.9)	34.7 (94.5)
		OFF	32.0 (89.6)	35.3 (95.5)

FAN MOTOR

Fan Motor Specifications

MODEL	RAS-25JX5, RAS-35JX5	RAC-25JX5, RAC-35JX5
POWER SOURCE	DC 5V, 35V	DC 140 - 350V
OUTPUT	25W	40W
CONNECTION	 (Control circuit built in)	

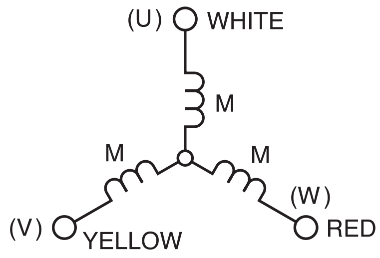
BLU : BLUE	YEL : YELLOW	BRN : BROWN	WHT : WHITE
GRY : GRAY	ORN : ORANGE	GRN : GREEN	RED : RED
BLK : BLACK	PNK : PINK	VIO : VIOLET	

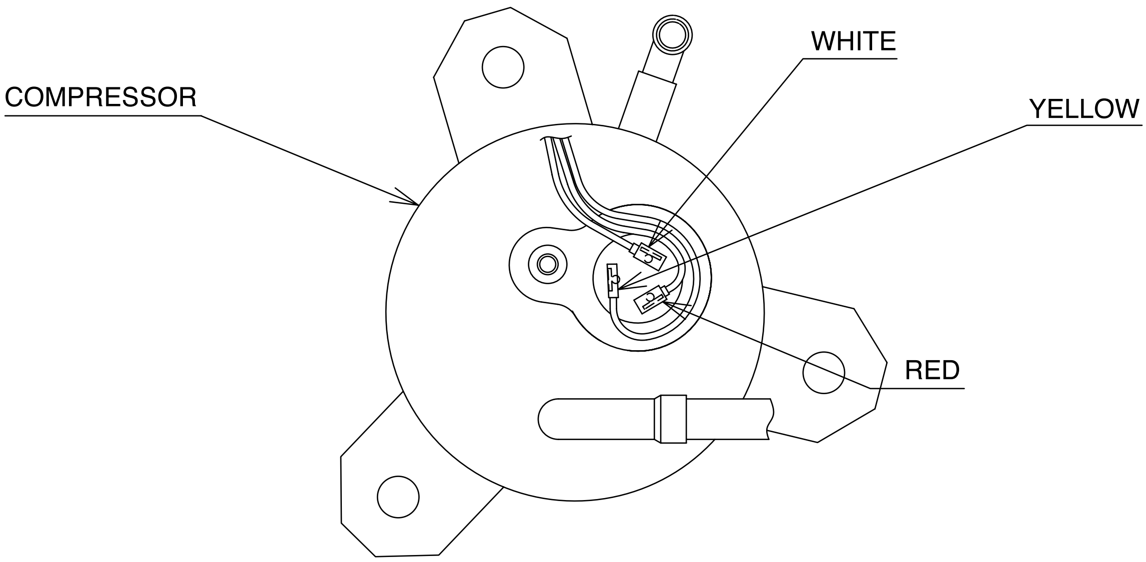
MAIN ELECTRIC COMPONENTS FOR OUTDOOR UNIT

NAME	RATING	APPLICABLE MODELS
REVERSING VALVE COIL	135Ω (20 ˚C)	RAC-25JX5, RAC-35JX5
REACTOR L1	13 (mH), 0.224Ω	RAC-25JX5, RAC-35JX5
REACTOR L2	25.5 (mH), 0.37Ω	RAC-25JX5, RAC-35JX5
FILM CAPACITOR	45 (μF)	RAC-25JX5, RAC-35JX5

COMPRESSOR MOTOR

Compressor Motor Specifications

ITEM \ MODEL		RAC-25JX5, RAC-35JX5
COMPRESSOR TYPE		EU1011DF
POWER SOURCE		DC 220 - 350 V
OUTPUT		800W
WINDING		
RESISTANCE (Ω)	20 ˚C	2M = 1.069
	75 ˚C	2M = 1.300



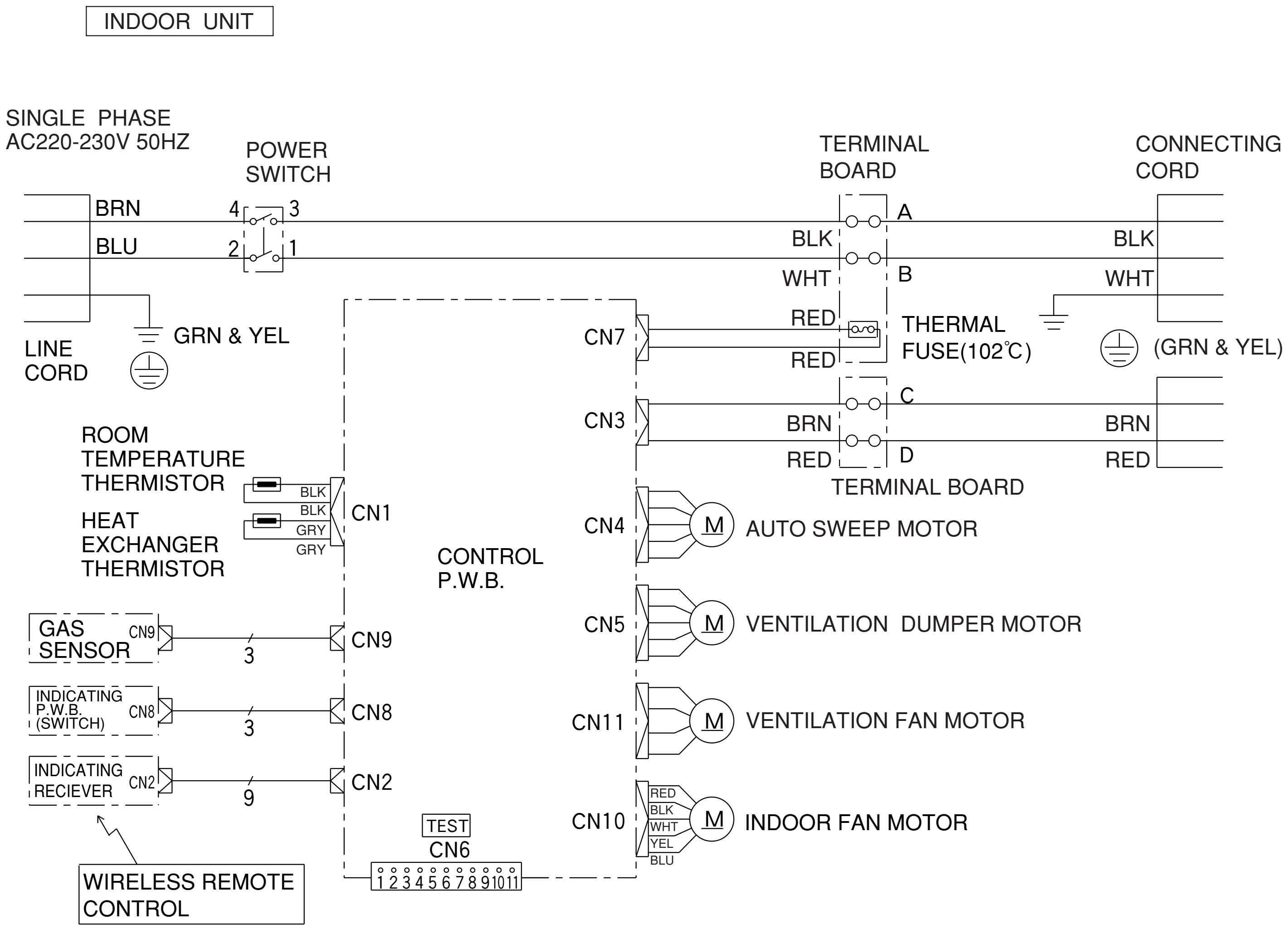
FRONT SIDE OF OUTDOOR UNIT

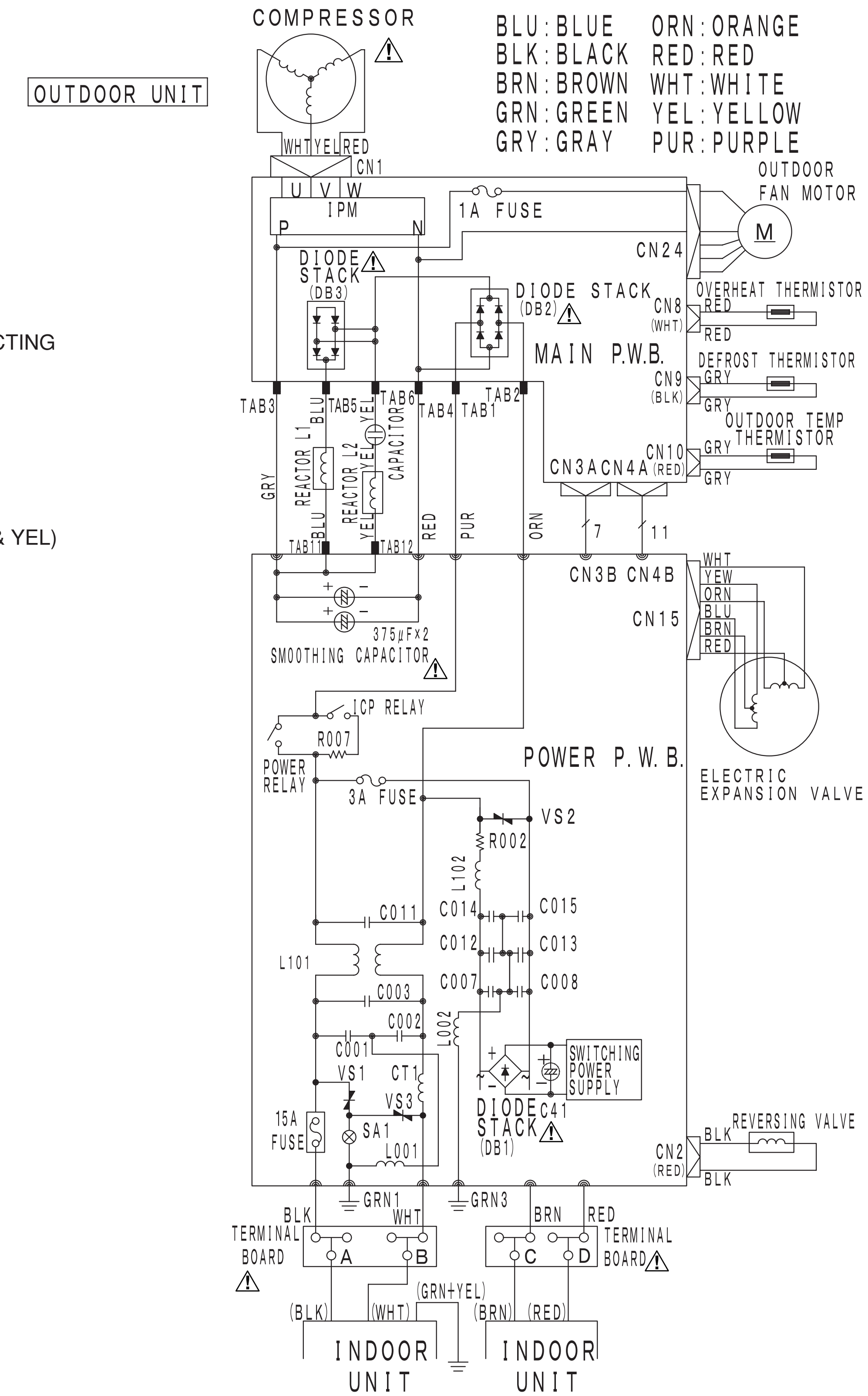
> **⚠ CAUTION**
>
> When the refrigerating cycle has been operated for a long time with the capillary tubes clogged or crushed or with too little refrigerant, check the color of the refrigerating machine oil inside the compressor. If the color has been changed conspicuously, replace the compressor.

WIRING DIAGRAM

MODEL RAS-25JX5 / RAC-25JX5
RAS-35JX5 / RAC-35JX5

⚠ CAUTION
The marked parts ⚠ are very important ones for safety.



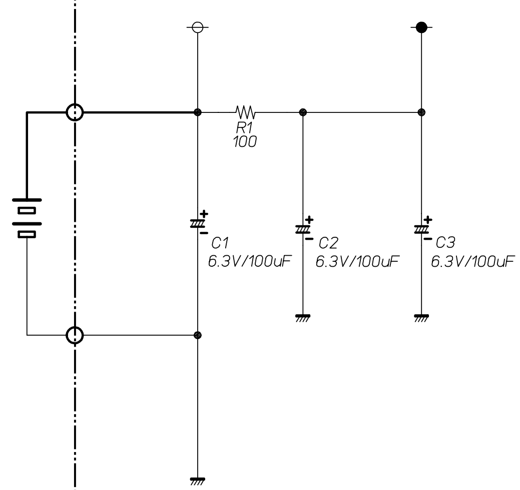


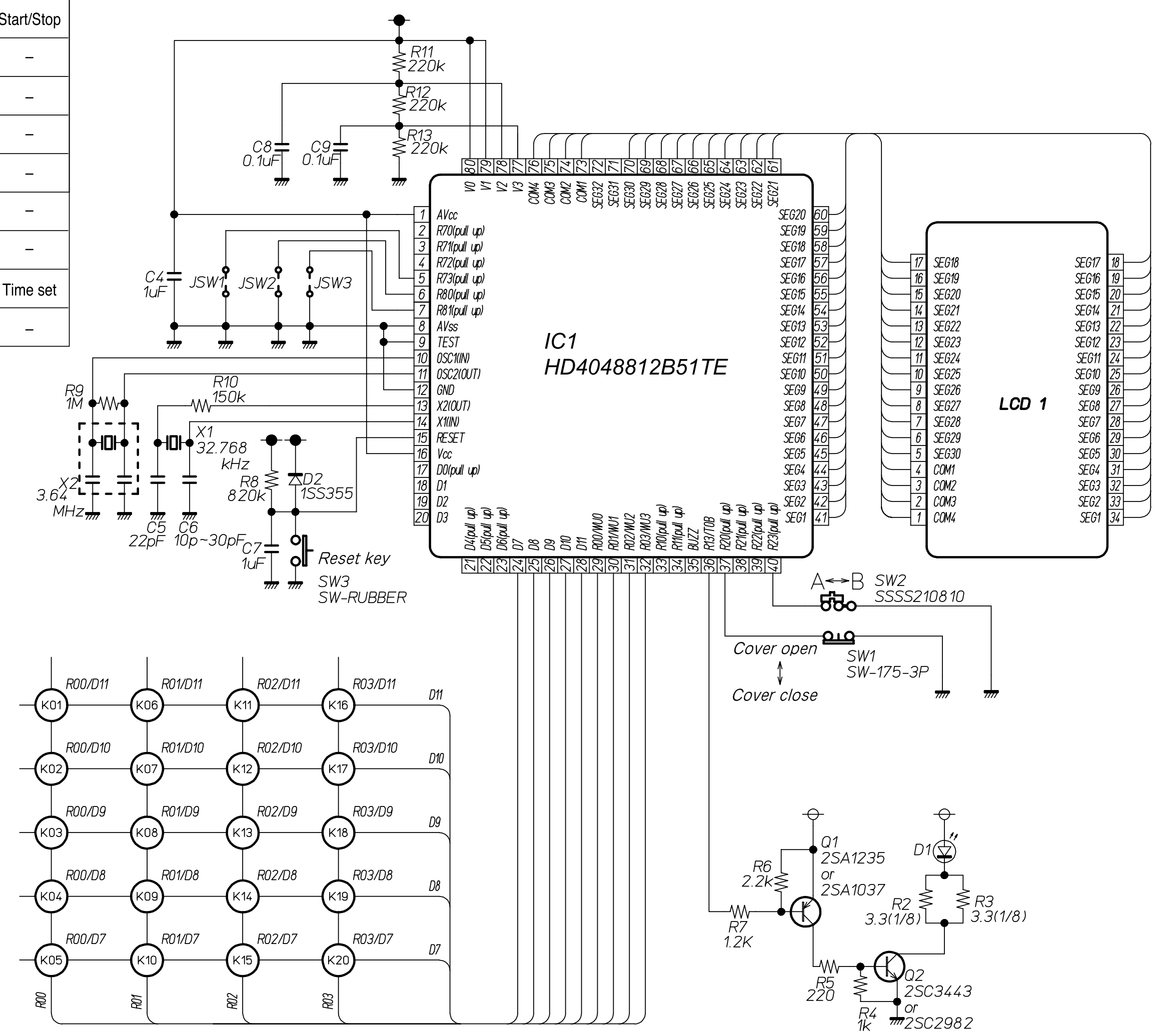
WIRING DIAGRAM OF THE PRINTED WIRING BOARD

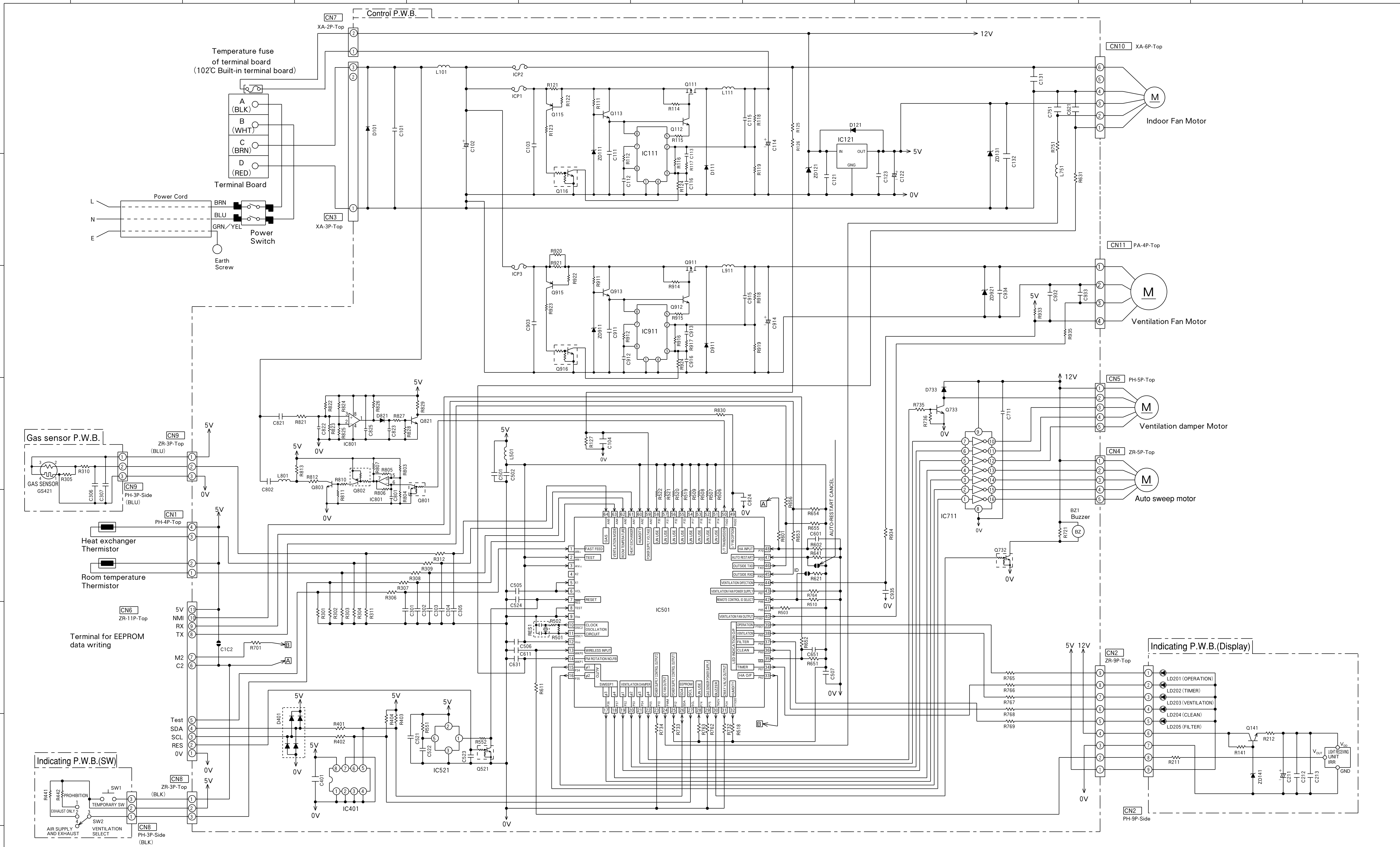
Remote Control (RAR-3E1)

Key matrix table

Output	Input	R00	R01	R02	R03
D11	Door open	Self clean	Automatic two way air exchange	Air purifier	Start/Stop
	Door shut	Heating mode	Auto mode	Cooling mode	Start/Stop
D10	Door open	Fan speed selection	–	Operation selection	–
	Door shut	–	–	–	–
D9	Door open	Fresh air in during sleep mode	–	Automatic swing	–
	Door shut	Room temperature up	–	Fan speed up	–
D8	Door open	Off timer	Hour up	Reservation	–
	Door shut	Room temperature down	–	Fan speed down	–
D7	Door open	On timer	Hour down	Cancel	Time set
	Door shut	Two way air exchange	–	Sleep	–







注記

1. Type of Capacitor
   - F……Film Capacitor
   - C……Ceramic Capacitor
   - D(※)……Electrolytic Capacitor
     (※Maker series name)
2. H and G written right side of a part table show the following
   - H……Indicating P.W.B. part
   - G……Gas sensor P.W.B. part
3. Symbol of the parts list is as follow

Symbol	Shape
A	Axial
R	Radial
H	Manual
C	Chip Field Mounting
S	Other Field Mounting

Resistor

Circuit's Symbol	Numerical Value (Ω)	Common diff.	Power (W)	Drawing's part's No.	Shape	
R111	27K	±5%	1/10W	014	C	
R112	30K	±5%	1/16W	029	C	
R114	750	±5%	1/8W	010	C	
R115	560	±5%	1/8W	011	C	
R116	–	–	–	–	–	
R117	68K	±5%	1/16W	024	C	
R118	75K	±2%	1/16W	021	C	
R119	6.8K	±2%	1/16W	022	C	
R121	0.56	±5%	1/4W	008	C	
R122	100	±5%	1/16W	042	C	
R123	33K	±5%	1/16W	043	C	
R124	100	±5%	1/16W	042	C	
R125	30K	±5%	1/16W	029	C	
R126	30K	±5%	1/16W	029	C	
R127	5.1K	±5%	1/16W	040	C	
R141	2.7K	±5%	1/10W	009	C	H
R211	1K	±5%	1/16W	011	C	H
R212	47	±5%	1/10W	008	C	H
R301	10K	±5%	1/16W	030	C	
R302	10K	±5%	1/16W	030	C	
R303	12.7K	±1%	1/16W	018	C	
R304	12.7K	±1%	1/16W	018	C	
R305	–	–	–	–	–	G

Circuit's Symbol	Numerical Value (Ω)	Common diff.	Power (W)	Drawing's part's No.	Shape	
R306	1K	±5%	1/16W	033	C	
R307	1K	±5%	1/16W	033	C	
R308	1K	±5%	1/16W	033	C	
R309	1K	±5%	1/16W	033	C	
R310	0	±5%	1/16W	012	C	G
R311	10K	±5%	1/16W	030	C	
R312	1K	±5%	1/16W	033	C	
R401	390	±5%	1/16W	027	C	
R402	390	±5%	1/16W	027	C	
R403	5.1K	±5%	1/16W	040	C	
R404	5.1K	±5%	1/16W	040	C	
R441	10K	±5%	1/16W	012	C	H
R442	100	±5%	1/16W	010	C	H
R501	1M	±5%	1/16W	041	C	
R502	0	±5%	1/16W	025	C	
R503	10K	±5%	1/16W	030	C	
R506	10K	±5%	1/16W	030	C	
R507	10K	±5%	1/16W	030	C	
R508	10K	±5%	1/16W	030	C	
R509	10K	±5%	1/16W	030	C	
R510	10K	±5%	1/16W	030	C	
R518	10K	±5%	1/16W	030	C	
R519	10K	±5%	1/16W	030	C	
R520	10K	±5%	1/16W	030	C	
R521	10K	±5%	1/16W	030	C	
R522	10K	±5%	1/16W	030	C	

Circuit's Symbol	Numerical Value (Ω)	Common diff.	Power (W)	Drawing's part's No.	Shape
R551	1M	±5%	1/16W	041	C
R552	1K	±5%	1/16W	033	C
R601	1K	±5%	1/16W	033	C
R602	10K	±5%	1/16W	030	C
R611	1K	±5%	1/16W	033	C
R621	1K	±5%	1/16W	033	C
R631	1K	±5%	1/16W	033	C
R641	10K	±5%	1/16W	030	C
R651	1K	±5%	1/16W	033	C
R652	100	±5%	1/16W	042	C
R653	1K	±5%	1/16W	033	C
R654	10K	±5%	1/16W	030	C
R655	10K	±5%	1/16W	030	C
R656	1K	±5%	1/16W	033	C
R701	1K	±5%	1/16W	033	C
R721	3.3K	±5%	1/16W	036	C
R732	10K	±5%	1/16W	030	C
R733	10K	±5%	1/16W	030	C
R734	10K	±5%	1/16W	030	C
R735	3K	±5%	1/16W	037	C
R736	10K	±5%	1/16W	030	C
R751	2.7K	±5%	1/16W	034	C

Circuit's Symbol	Numerical Value (Ω)	Common diff.	Power (W)	Drawing's part's No.	Shape
R762	10K	±5%	1/16W	030	C
R763	10K	±5%	1/16W	030	C
R764	10K	±5%	1/16W	030	C
R765	270	±5%	1/16W	026	C
R766	300	±5%	1/16W	032	C
R767	300	±5%	1/16W	032	C
R768	270	±5%	1/16W	026	C
R769	300	±5%	1/16W	032	C
R803	120K	±5%	1/16W	031	C
R804	120K	±5%	1/16W	031	C
R805	120K	±5%	1/16W	031	C
R806	120K	±5%	1/16W	031	C
R807	4.3K	±5%	1/16W	038	C
R810	680	±5%	1/16W	028	C
R811	2K	±5%	1/16W	035	C
R812	39	±5%	1/8W	013	C
R813	39	±5%	1/8W	013	C
R821	1K	±5%	1/16W	033	C
R822	10K	±1%	1/16W	017	C
R823	10K	±1%	1/16W	017	C
R824	8.25K	±1%	1/16W	016	C
R825	10K	±1%	1/16W	017	C
R826	1K	±5%	1/16W	033	C
R827	3K	±5%	1/16W	037	C
R828	10K	±5%	1/16W	030	C
R829	5.1K	±5%	1/16W	040	C
R830	1K	±5%	1/16W	033	C

Circuit's Symbol	Numerical Value (Ω)	Common diff.	Power (W)	Drawing's part's No.	Shape
R911	27K	±5%	1/10W	014	C
R912	30K	±5%	1/16W	029	C
R914	750	±5%	1/8W	010	C
R915	560	±5%	1/8W	011	C
R916	–	–	–	–	–
R917	68K	±5%	1/16W	024	C
R918	33K	±2%	1/16W	020	C
R919	3K	±2%	1/16W	019	C
R920	0.68	±5%	1/4W	007	C
R921	0.68	±5%	1/4W	007	C
R922	100	±5%	1/16W	042	C
R923	33K	±5%	1/16W	043	C
R924	100	±5%	1/16W	042	C
R933	10K	±5%	1/16W	030	C
R934	1K	±5%	1/16W	033	C
R935	100	±5%	1/16W	042	C

Capacitor

Circuit's Symbol	Numerical Value (F)	Voltage	Type	Drawing's part's No.	Shape	
C101	0.22μ	50V	F	062	H	
C102	390μ	50V	D (LXZ)	065	R	
C103	470p	630V	C	052	C	
C104	0.1μ	25V	C (F特)	045	C	
C111	2.2μ	10V	C (B特)	058	C	
C112	1000P	50V	C (B特)	047	C	
C113	0.047μ	25V	C (B特)	056	C	
C114	220μ	25V	D (LXZ)	066	R	
C115	–	–	–	–	–	
C116	–	–	–	–	–	
C121	0.1μ	25V	C (F特)	045	C	
C122	100μ	10V	D (UR)	068	C	
C123	0.1μ	25V	C (F特)	045	C	
C131	0.22μ	50V	C (B特)	046	C	
C132	0.1μ	25V	C (F特)	045	C	
C211	47μ	16V	D (MF)	021	H	H
C212	–	–	–	–	–	H
C213	–	–	–	–	–	H
C301	0.1μ	25V	C (F特)	045	C	
C302	0.1μ	25V	C (F特)	045	C	
C303	0.1μ	25V	C (F特)	045	C	
C304	0.1μ	25V	C (F特)	045	C	
C305	0.1μ	25V	C (F特)	045	C	
C306	–	–	–	–	–	G

Circuit's Symbol	Numerical Value (F)	Voltage	Type	Drawing's part's No.	Shape	
C307	–	–	–	–	–	G
C401	0.1μ	25V	C (F特)	045	C	
C501	0.1μ	25V	C (F特)	045	C	
C502	0.1μ	25V	C (F特)	045	C	
C505	0.1μ	25V	C (F特)	045	C	
C506	0.1μ	25V	C (F特)	045	C	
C507	0.1μ	25V	C (F特)	045	C	
C521	0.1μ	25V	C (F特)	045	C	
C522	0.22μ	10V	C (B特)	057	C	
C523	0.1μ	25V	C (F特)	045	C	
C524	0.1μ	25V	C (F特)	045	C	
C601	0.1μ	25V	C (F特)	045	C	
C611	1000P	50V	C (B特)	047	C	
C621	–	–	–	–	–	
C631	1000P	50V	C (B特)	047	C	
C651	0.1μ	25V	C (F特)	045	C	
C711	0.1μ	25V	C (F特)	045	C	
C751	1μ	16V	C (F特)	049	C	
C801	150P	50V	C (CH特)	048	C	
C802	0.15μ	50V	F	063	H	
C821	0.01μ	50V	F	061	R	
C822	1000P	50V	C (B特)	047	C	
C823	0.047μ	25V	C (B特)	056	C	
C824	0.01μ	50V	C (B特)	055	C	
C825	–	–	–	–	–	

Circuit's Symbol	Numerical Value (F)	Voltage	Type	Drawing's part's No.	Shape
C903	470p	630V	C	052	C
C911	2.2μ	10V	C (B特)	058	C
C912	1000P	50V	C (B特)	047	C
C913	0.047μ	25V	C (B特)	056	C
C914	1000μ	25V	D (LXZ)	067	R
C915	–	–	–	–	–
C916	–	–	–	–	–
C932	0.1μ	25V	C (F特)	045	C
C933	–	–	–	–	–
C934	0.1μ	25V	C (F特)	045	C
C935	0.1μ	25V	C (F特)	045	C

Gas sensor

Circuit's Symbol	Model	Drawing's part's No.	Shape	
GS421	TGS2600–B02	007	H	G

Transistor

Circuit's Symbol	Model	Drawing's part's No.	Shape	
Q111	2SJ518	076	C	
Q112	2SC5209H	074	C	
Q113	2SC5209H	074	C	
Q115	2SA1162Y	079	C	
Q116	RN1102	078	C	
Q141	2SC2462LC	015	C	H
Q521	RN1102	078	C	
Q732	RN1102	078	C	
Q733	2SD1484K	081	C	
Q801	RN1102	078	C	
Q802	RN2102	080	C	
Q803	2SC3441E	072	C	
Q821	2SC4738GRY	073	C	

Circuit's Symbol	Model	Drawing's part's No.	Shape
Q911	2SJ527S	071	C
Q912	2SC5209H	074	C
Q913	2SC5209H	074	C
Q915	2SA1162Y	079	C
Q916	RN1102	078	C

LED

Circuit's Symbol	Model	Color	Drawing's part's No.	Shape	
LD201	HLMF–K305	Yellow	025	H	H
LD202	HLMF–K405	Orange	026	H	H
LD203	HLMF–K505	Green	027	H	H
LD204	HLMF–K305	Yellow	025	H	H
LD205	HLMF–K305	Green	027	H	H

Over Current Protecter

Circuit's Symbol	Model	Rating Current	Drawing's part's No.	Shape
ICP1	CCP2E–20	0.8A	103	C
ICP2	CCP2E–50	2.0A	104	C
ICP3	CCP2E–30	1.2A	105	C

Diode

Circuit's Symbol	Model	Drawing's part's No.	Shape
D101	DSM3MA2	091	C
D111	D1FS6	092	C
D121	1SS355	095	C
D401	HN1D03FU	093	C
D733	1SS355	095	C
D821	1SS355	095	C
D911	D1FS6	092	C

Oscillator

Circuit's Symbol	Model	Frequency	Drawing's part's No.	Shape
RES1	EFOS1005E5	10MHz	107	C

Buzzer

Circuit's Symbol	Model	Drawing's part's No.	Shape
BZ1	PKM13EPY	131	H

Sensor Unit

Circuit's Symbol	Model	Drawing's part's No.	Shape	
IRR	RPM6938	029	H	H

IC

Circuit's Symbol	Model	Drawing's part's No.	Shape
IC111	NJM2340M	082	S
IC121	BA17805FP	083	S
IC401	S–24C04BFJ	084	S
IC501	HD64F3687H	087	S
IC521	RN5VD42C	089	S
IC711	ULN2003ANS	090	S
IC801	NJM2903M	085	S
IC911	NJM2340M	082	S

Switch

Circuit's Symbol	Model	Drawing's part's No.	Shape	
SW1	EVQP09K–SW	031	H	H
SW2	SSSS919800	032	H	H

Zener Diode

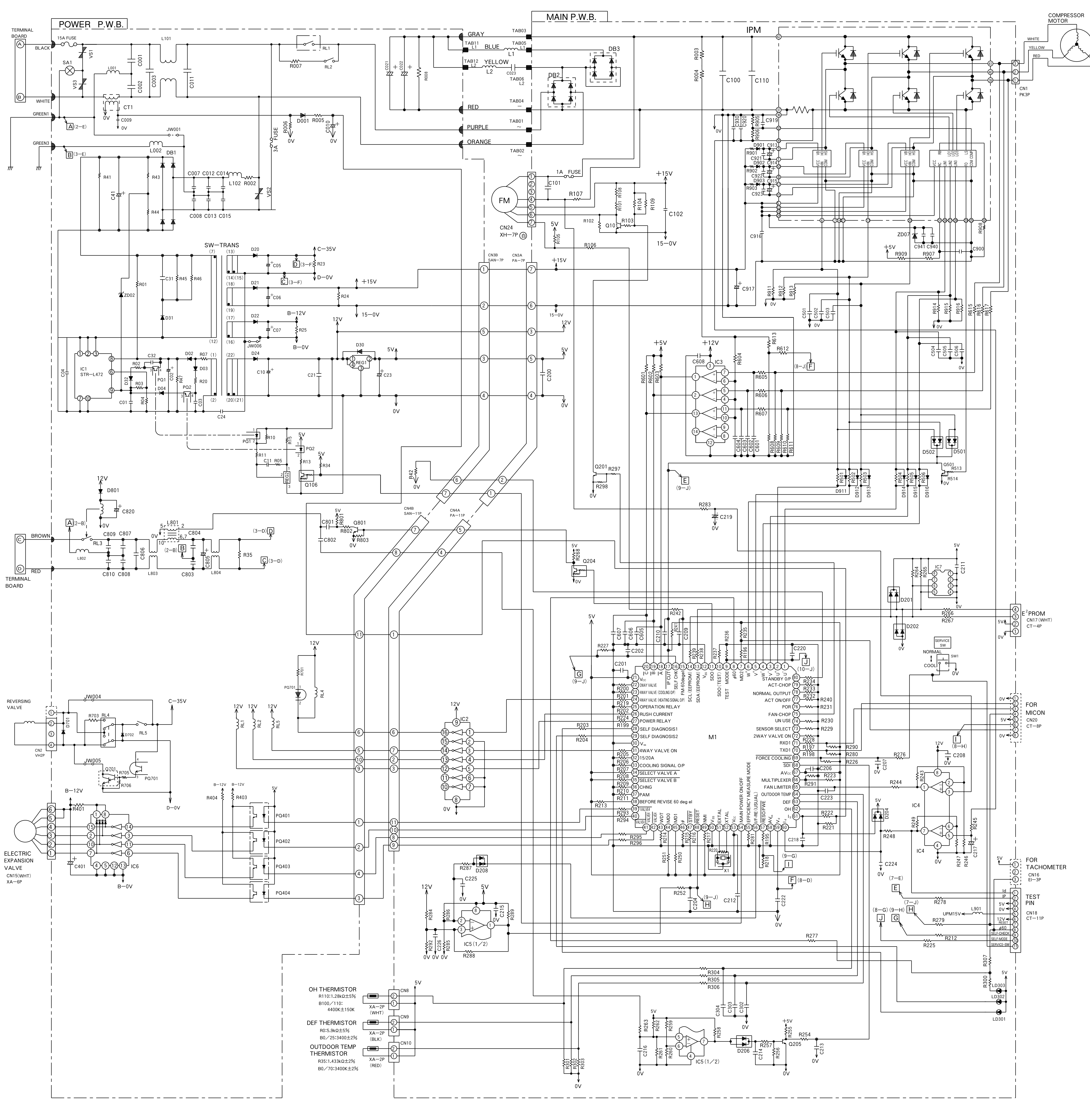
Circuit's Symbol	Model	Drawing's part's No.	Shape	
ZD111	RD6.2UJN2	101	C	
ZD121	PTZ20A	098	C	
ZD131	RLZ6.8A	099	C	
ZD141	RD5.6UJN2	018	C	H
ZD911	RD6.2UJN2	101	C	
ZD921	–	–	C	

Coil

Circuit's Symbol	Numerical Value (H)	Rating Current	Drawing's part's No.	Shape
L101	82μ	1.9A	112	H
L111	560μ	0.6A	113	H
L801	100μ	55mA	111	C
L911	470μ	0.93A	114	H
L501	1608Chip jumper	–	025	C
L751	1608Chip jumper	–	025	C

Connecter

Circuit's Symbol	Model	Drawing's part's No.	Shape	
CN1	PH–4P–Top	116	S	
CN2	ZR–9P–Top	117	S	
CN2	PH–9P–Side	037	H	H
CN3	XA–3P–Top	118	S	
CN4	ZR–5P–Top	119	S	
CN5	PH–5P–Top	120	H	
CN6	ZR–11P–Top	121	S	
CN7	XA–2P–Top	126	S	
CN8	ZR–3P–Top (BLK)	122	S	
CN8	PH–3P–Side (BLK)	036	H	H
CN9	ZR–3P–Top (BLU)	123	S	
CN9	PH–3P–Side (BLU)	016	H	G
CN10	XA–6P–Top	124	S	
CN11	PA–4P–Top	125	S	



・MOUNTING
A : AXIAL
R : RADIAL
H : MANUAL INSERT
C : CHIP SMT
S : OTHER SMT

・BOARD
P : POWER P.W.B.
M: MAIN P.W.B.

・CAPACITOR TYPE
C : CERAMIC
F : FILM
H : ELECTROLYTIC INSERT

RESISTORS

SYMBOL	REATING VALUE (Ω)	LIMIT	POWER (W)	MOUNTING	BOARD
R01	1.5M	5%	1/4	A	P
R02	3.3K	5%	1/4	A	P
R03	680	5%	1/4	A	P
R04	0.56	5%	1W	R	P
R05	470	5%	1/4	A	P
R07	47	2%	1/4	A	P
R10	1K	1%	1/4	A	P
R11	1K	1%	1/4	A	P
R13	390	5%	1/4	A	P
R15	33	1%	1/4	A	P
R20	2.2K	5%	1/4	A	P
R23					P
R24					P
R25					P
R34					P
R35	6.8k	5%	1	R	P
R39					P
R41	1M	5%	1/4	A	P
R42	10K	5%	1/6	A	P
R43	820K	5%	1/2	A	P
R44	27K	5%	1/4	A	P
R45	220K	5%	2	A	P
R46	220K	5%	2	A	P
R47	470K	5%	1/6	A	P
R002	2.2	5%	5	H	P
R003	360K	0.5%	1/2	A	M
R004	360K	0.5%	1/2	A	M
R005	1.96K	1%	1/6	A	P
R006	1K	1%	1/6	A	P
R007	100	5%	10	H	P
R008	240K	5%	1/2	A	P
R101	1.8K	1%	1/10	C	M
R102	3K	1%	1/16	C	M
R103	390	5%	1/16	C	M
R104	15K	5%	1/16	C	M
R105	4.7K	5%	1/16	C	M
R106	10K	5%	1/16	C	M
R107	0.24	0.5%	2	R	M
R108	1.8K	1%	1/10	C	M
R109	15K	5%	1/16	C	M
R195	390	5%	1/16	C	M
R196	390	5%	1/16	C	M
R197	390	5%	1/16	C	M
R198	390	5%	1/16	C	M
R199	100	5%	1/16	C	M
R200	10K	5%	1/16	C	M
R201	10K	5%	1/16	C	M
R202	10K	5%	1/16	C	M
R203	2K	5%	1/16	C	M
R204	2K	5%	1/16	C	M
R205	100	5%	1/16	C	M
R206	10K	5%	1/16	C	M
R207	10K	5%	1/16	C	M
R208	10K	5%	1/16	C	M
R209	10K	5%	1/16	C	M
R210	10K	5%	1/16	C	M
R211	10K	5%	1/16	C	M
R212	1K	5%	1/16	C	M
R213	10K	5%	1/16	C	M
R214	10K	5%	1/16	C	M
R215	10K	5%	1/16	C	M
R216	10K	5%	1/16	C	M
R217	10K	5%	1/16	C	M
R218	10K	5%	1/16	C	M
R219	100	5%	1/16	C	M
R220	1M	5%	1/16	C	M
R221	10K	1%	1/16	C	M
R222	510	5%	1/16	C	M
R223	10K	5%	1/16	C	M
R224	100	5%	1/16	C	M
R225	1K	5%	1/16	C	M
R226	10K	5%	1/16	C	M
R227	10K	5%	1/16	C	M
R228	10K	5%	1/16	C	M
R229	10K	5%	1/16	C	M
R230	10K	5%	1/16	C	M
R231	10K	5%	1/16	C	M
R232	10K	5%	1/16	C	M
R233	10K	5%	1/16	C	M
R234	100	5%	1/16	C	M
R235	10K	5%	1/16	C	M
R236	10K	5%	1/16	C	M
R237	10K	5%	1/16	C	M
R238	100	5%	1/16	C	M
R239	100	5%	1/16	C	M
R240	10K	5%	1/16	C	M
R241	5.6K	5%	1/16	C	M
R242	1K	5%	1/16	C	M
R243	6.98K	1%	1/16	C	M
R244	2K	5%	1/16	C	M
R245	10K	5%	1/16	C	M
R246	1K	1%	1/16	C	M
R247	1.5K	1%	1/16	C	M

RESISTORS

SYMBOL	REATING VALUE (Ω)	LIMIT	POWER (W)	MOUNTING	BOARD
R248	2K	5%	1/16	C	M
R249	20K	1%	1/16	C	M
R250	10K	5%	1/16	C	M
R251	10K	5%	1/16	C	M
R252	5.1K	5%	1/16	C	M
R254	100	5%	1/16	C	M
R255	2K	5%	1/16	C	M
R256	10K	5%	1/16	C	M
R257	3K	5%	1/16	C	M
R258	1K	5%	1/16	C	M
R259	8.25K	1%	1/16	C	M
R260	10K	1%	1/16	C	M
R261	10K	1%	1/16	C	M
R262	10K	1%	1/16	C	M
R263	1K	5%	1/16	C	M
R264	5.1K	5%	1/16	C	M
R265	5.1K	5%	1/16	C	M
R266	390	5%	1/16	C	M
R267	390	5%	1/16	C	M
R268	2K	5%	1/16	C	M
R276	100	5%	1/16	C	M
R277	100	5%	1/16	C	M
R278	100	5%	1/16	C	M
R279	100	5%	1/16	C	M
R280	10K	5%	1/16	C	M
R281	10K	5%	1/16	C	M
R283	10K	5%	1/16	C	M
R284	10K	2%	1/16	C	M
R285	4.7K	2%	1/16	C	M
R286	5.1K	2%	1/16	C	M
R287	1.8K	2%	1/16	C	M
R288	51K	5%	1/16	C	M
R289	5.1K	5%	1/16	C	M
R290	10K	5%	1/16	C	M
R291	10K	5%	1/16	C	M
R292	3K	2%	1/16	C	M
R293	390	5%	1/16	C	M
R294	390	5%	1/16	C	M
R295	390	5%	1/16	C	M
R296	390	5%	1/16	C	M
R297	10K	5%	1/16	C	M
R298	5.1K	5%	1/16	C	M
R300	2K	5%	1/16	C	M
R301	3.74K	1%	1/16	C	M
R302	3.01K	1%	1/16	C	M
R303	3.01K	1%	1/16	C	M
R304	100	5%	1/16	C	M
R305	100	5%	1/16	C	M
R306	100	5%	1/16	C	M
R307	1K	5%	1/16	C	M
R401	100	5%	1/4	A	P
R403	1K	5%	1/4	A	P
R404	1K	5%	1/4	A	P
R501	2K	5%	1/16	C	M
R502	2K	5%	1/16	C	M
R503	2K	5%	1/16	C	M
R504	2K	5%	1/16	C	M
R505	2K	5%	1/16	C	M
R506	2K	5%	1/16	C	M
R513	10K	5%	1/16	C	M
R514	5.1K	5%	1/16	C	M
R601	2K	5%	1/16	C	M
R602	2K	5%	1/16	C	M
R603	2K	5%	1/16	C	M
R604	100	5%	1/16	C	M
R605	100	5%	1/16	C	M
R606	100	5%	1/16	C	M
R607	100	5%	1/16	C	M
R608	6.65K	1%	1/16	C	M
R609	6.65K	1%	1/16	C	M
R610	6.65K	1%	1/16	C	M
R611	6.65K	1%	1/16	C	M
R612	100K	5%	1/16	C	M
R613	0		1/16	C	M
R615	360K	0.5%	1/2	A	M
R616	360K	0.5%	1/2	A	M
R617	360K	0.5%	1/2	A	M
R701	1.2K	5%	1/4	A	P
R703					P
R705	7.5K	5%	1/2	A	P
R706	10K	5%	1/6	A	P
R801	39	5%	1/4	A	P
R802	39	5%	1/4	A	P
R803	3K	5%	1/6	A	P
R804					P
R901	10	5%	1/16	C	M
R902	10	5%	1/16	C	M
R903	10	5%	1/16	C	M
R905	453	1%	1/16	C	M
R906	100	1%	1/16	C	M
R907	1M	5%	1/16	C	M
R908	30K	1%	1/16	C	M
R909	510K	5%	1/16	C	M
R911					M
R912					M
R913					M
R914	100K	5%	1/16	C	M
R915	100K	5%	1/16	C	M
R916	100K	5%	1/16	C	M

CAPACITORS

SYMBOL	RATING VALUE (μF)	VOLT (V)	TYPE	MOUNTING	BOARD
C01	470p	50	C		
C02	10	50	D	R	P
C03	1500p	50	C	R	P
C04	470p	2K	C	R	P
C05	560	50	D	R	P
C06	330	25	D	R	P
C07	330	25	D	R	P
C10	330	25	D	R	P
C11	0.1	50	C	R	P
C21	0.1	50	C	R	P
C23	470	10	D	R	P
C24	470p	2K	C	R	P
C31	0.01	DC 630	C	R	P
C32	0.01	50	C	R	P
C41	68	450	D	H	P
C001	0.01	AC 250	C	R	P
C002	0.01	AC 250	C	R	P
C003	0.47	AC 250	F	H	P
C006					
C007	0.01	AC 250	C	R	P
C008	0.01	AC 250	C	R	P
C009	0.1	50	C	R	P
C010	100	10	D	R	P
C011	0.47	AC 250	F	H	P
C012	0.01	AC 250	C	R	P
C013	0.01	AC 250	C	R	P
C014	0.01	AC 250	C	R	P
C015	0.01	AC 250	C	R	P
C021	375	420	D	H	P
C022	375	420	D	H	P
C023	45	AC 230	F	H	※
C100	0.01	DC 1kV	C	R	M
C101	0.082	DC 630	F	H	M
C102	0.1	25	C	C	M
C110					M
C200	0.1	25	C	C	M
C201	0.1	25	C	C	M
C202	0.1	25	C	C	M
C204	0.047	50	C	C	M
C206	0.1	25	C	C	M
C207	0.047	50	C	C	M
C208	0.1	25	C	C	M
C209	0.0047	50	C	C	M
C210	0.047	50	C	C	M
C211	0.1	25	C	C	M
C212	0.1	25	C	C	M
C213	0.047	50	C	C	M
C214	0.068	25	C	C	M
C215	0.1	25	C	C	M
C216	0.0047	50	C	C	M
C217	22	10	D	R	M
C218	0.1	25	C	C	M
C219	22	10	D	R	M
C220	0.1	25	C	C	M
C222	0.022	25	C	C	M
C223	0.01	50	C	C	M
C224	0.01	50	C	C	M
C225	0.01	50	C	C	M
C226	0.1	25	C	C	M
C302	0.1	25	C	C	M
C303	0.1	25	C	C	M
C304	0.1	25	C	C	M
C401	100	25	D	R	P
C501	470p	50	C	C	M
C502	470p	50	C	C	M
C503	470p	50	C	C	M
C504					M
C505					M
C506					M
C601	0.00068	50	C	C	M
C602	0.00068	50	C	C	M
C603	0.00068	50	C	C	M
C604	0.00068	50	C	C	M
C605	0.001	50	C	C	M
C606	0.001	50	C	C	M
C607	0.001	50	C	C	M
C608	0.1	25	C	C	M
C801	0.15	50	F	R	P
C802	0.022	50	F	R	P
C803	0.01	AC 250	C	R	P
C804	0.01	AC 250	C	R	P
C805	68	50	D	R	P
C806	0.15	50	F	R	P
C807	0.01	AC 250	C	R	P
C808	0.01	AC 250	C	R	P
C809	0.01	AC 250	C	R	P
C810	0.01	AC 250	C	R	P
C820	100	25	D	R	P

CAPACITORS

SYMBOL	RATING VALUE (μF)	VOLT (V)	TYPE	MOUNTING	BOARD
C900	2200p	50	C	C	M
C913	10	25	D	C	M
C914	10	25	D	C	M
C915	10	25	D	C	M
C916	0.1	25	C	C	M
C917	10	25	D	C	M
C919	0.01	50	C	C	M
C920	0.1	25	C	C	M
C921					M
C922					M
C923					M
C930					M
C940	1	25	C	C	M
C941					M

DIODES

SYMBOL	MODEL	MOUNTING	BOARD
DB1	D2SB60	H	P
DB2	D10XB60	H	M
DB3	D10XB60	H	M
D02	1GH46	A	P
D03	1GH46	A	P
D04	1GH46	A	P
D20	RL4Z	H	P
D21	AG01Z	A	P
D22	RN2Z	H	P
D24	AG01Z	A	P
D30	1SS120	A	P
D31	EG01C	A	P
D32	AG01Z	A	P
D001	1SS120	A	P
D201	DAN202K	C	M
D202	DAP202K	C	M
D204	DAN202K	C	M
D206	DAN202K	C	M
D208	DAN202K	C	M
D501	DAN202K	C	M
D502	DAN202K	C	M
D701	1GH46	A	
D702			
D801	1SS120	A	P
D901	D1NL40	H	M
D902	D1NL40	H	M
D903	D1NL40	H	M
D911			M
D912			M
D913			M
D914			M
D915			M
D916			M

JUMPER

SYMBOL	USE/UN USE	MOUNTING	BOARD
JW001	UN USE	A	P
JW004	USE	A	P
JW005	USE	A	P
JW006	USE	A	P

ZENER DIODE

SYMBOL	MODEL	MOUNTING	BOARD
ZD01			P
ZD02	MTZJT-6.8B	A	P
			P
			P
ZD07	UDZS 20B	C	M

※OUTDOOR UNIT
ELECTRIC ASSEMBLY

TRANSISTORS

SYMBOL	MODEL	MOUNTING	BOARD
Q101	2SC2412K	C	M
Q106	DTC114YSA	R	P
Q201	2SC2412K	C	M
Q204	RN1402	C	M
Q205	2SC2412K	C	M
Q501	2SC2412K	C	M
Q701	2SC1214CTZ	R	P
Q801	2SC1214CTZ	R	P

RELAY

SYMBOL	MODEL	MOUNTING	BOARD
RL1	G4A	H	P
RL2	G5NB	H	P
RL3	G5NB	H	P
RL4			
RL5			

PHOTO COUPLERS

SYMBOL	MODEL	MOUNTING	BOARD
PQ1	TLP421	H	P
PQ2	TLP421	H	P
PQ401	TLP421	H	P
PQ402	TLP421	H	P
PQ403	TLP421	H	P
PQ404	TLP421	H	P
PQ701	TLP421	H	P

COILS・INDUCTORS

SYMBOL	RATING	MOUNTING	BOARD
L001	J/W	A	P
L002	HF70BTL3.5*6R	A	P
L101	2mH 15A	H	P
L102	4mH 2A (RRMH3728)	H	P
L801	RRMF3787	H	P
L802	HF70BTL3.5*6R	A	P
L803	RRMH3573	H	P
L804	RRMH3573	H	P
L901	BLM11A601S (RRMH3522)	C	M
CT1	RRMF3484	H	P

SURGE ABSORBERS

SYMBOL	RATING	MOUNTING	BOARD
VS1	450NR-12D	R	P
VS2	450NR-12D	R	P
VS3	450NR-12D	R	P
SA1	RA-102M-C6-Y	R	P

SWITCH

SYMBOL	MODEL	MOUNTING	BOARD
SW1	EVQPAE07K	R	M

OSCILLATOR

SYMBOL	MODEL	MOUNTING	BOARD
X1	CSTCV16MXJ0C3	C	M

LED

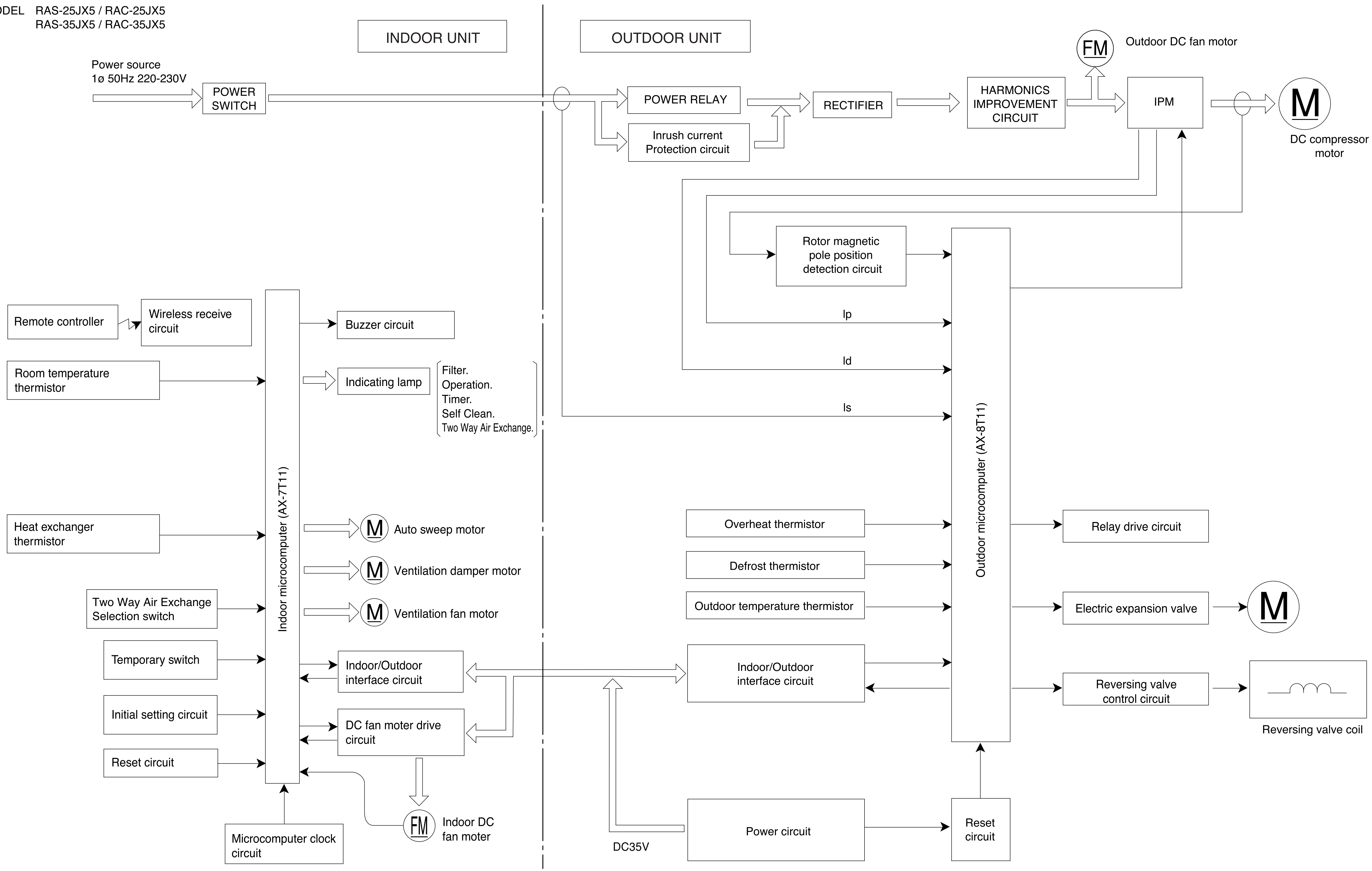
SYMBOL	MODEL	MOUNTING	BOARD
LD301	RED (TYP.IF=10mA VF=2.1V)	R	M
LD302	RED (TYP.IF=10mA VF=2.1V)	R	M
LD303	RED (TYP.IF=10mA VF=2.1V)	R	M

IC

SYMBOL	RATING	MOUNTING	BOARD
IC1	STR-L472	H	P
IC2	ULN2003ANS	S	M
IC3	BA10339F	S	M
IC4	NJM2904M-TE3	S	M
IC5	NJM2903V-TE1	S	M
IC6	M54532P	H	P
IC7	S24C02BFJ-TB	S	M
REG1	PQ05RD08	H	P
REG2	SE012	H	P
M1	AX-8T11	S	M
IPM	SSM1001MA	H	M

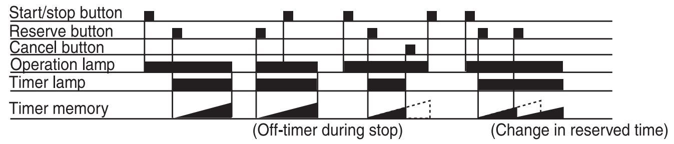
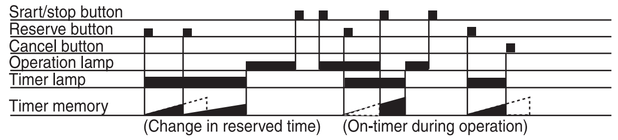
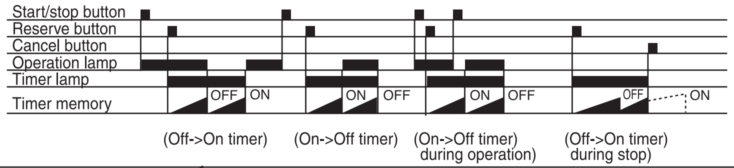
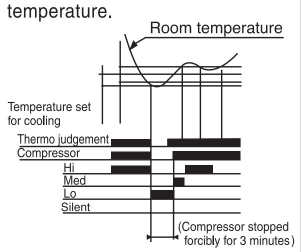
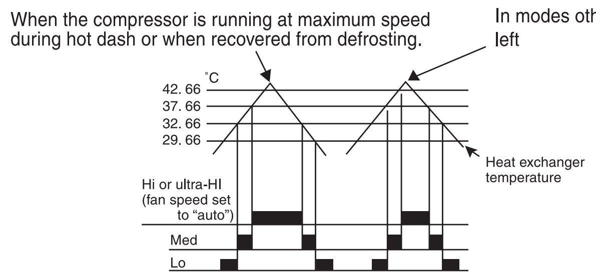
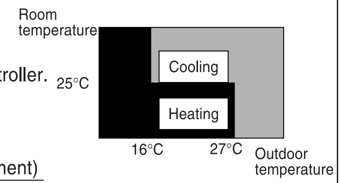
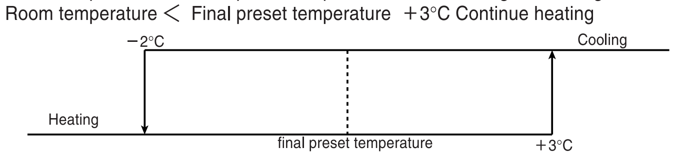
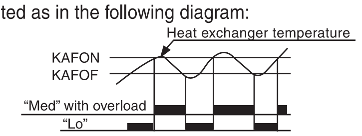
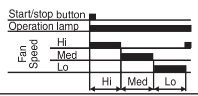
BLOCK DIAGRAM

MODEL RAS-25JX5 / RAC-25JX5
RAS-35JX5 / RAC-35JX5



BASIC MODE

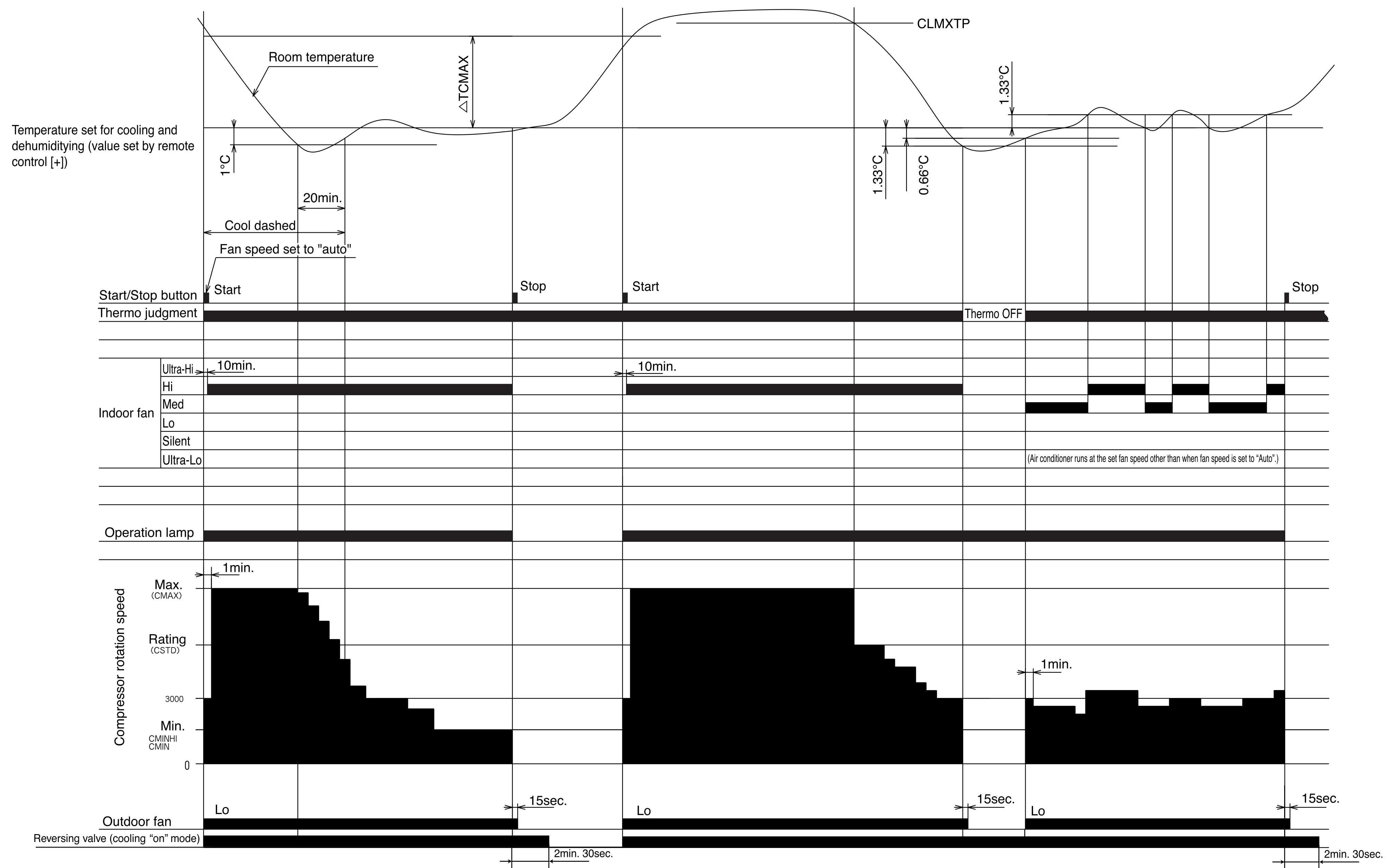
MODEL RAS-25JX5, RAS-35JX5

Operation mode	Air Purifier	Cooling	Dehumidifying (dehumidifying operation by the function select button only, not including that engaged by the dehumidify button)	Heating	auto
Basic operation of start/stop button					
Timer functions: Off-timer					
Timer functions: On-timer					
Timer functions: Off -> On On -> Off timer					
Fan speed mode (indoor fan): Auto		Changes from "Hi" to "Med" or "Lo" depending on room temperature.  1. Runs at "Hi" until first thermo off after operation is started. 2. Runs at "Lo" when thermo is off.		Set to "ultra-Lo", "Lo", "Med", "Hi", "ultra-Hi" or "stop" depending on the room temperature, time and heat exchange temperature. Set to "stop" if the room temperature is 18˚C in the "ultra-Lo" mode other than during preheating (cooling is recovered at 18.33˚C). 	Operating mode is judged by room temperature and outdoor temperature. (1) Judging by outdoor temperature Operating mode is judged by outdoor temperature. Only when the mode is not resticted by this judgment, the judgment by room temperature in the next paragraph will be performed. (a) Outdoor temperature ≧ 27°C : Restricted to cooling (b) Outdoor temperature ≦ 16°C : Restricted to heating (2) Judging by room temperature Operating mode at start up is judged (initial judgment) (a) Conditions for judgment (any of the followings) • When auto operation is started after 1 hour has elapsed since the operation was stopped. • When auto operation is started after the previous manual mode operation. • When the operating mode is switched to auto while operating at manual mode. (b) Judging method • Room temperature ≧ 25°C ±3°C : Cooling • Room temperature < 25°C ±3°C : Heating ※ ±3°C is the fine adjustment value from the remote controller.  Judging operating mode change during operation (Continuous judgment) (a) Conditions for judgment (any of the followings) • The mode is reviewed at every interval time. • When auto operation is started again before 1 hour has elapsed since the operation was stopped. (b) Judging method • Judge by setting the hysteresis on the final preset temperature. The final preset temperature is the actually targeted preset temperature which is the sum of the basic preset temperature and each type of shift value (e.g. ±3°C by remote controller, preset temperature correction value, powerful shift value, etc.) [Currently cooling] • Room temperature ≦ Final preset temperature −2°C Change to heating • Room temperature > Final preset temperature −2°C Continue cooling [Currently heating] • Room temperature ≧ Final preset temperature +3°C Change to cooling • Room temperature < Final preset temperature +3°C Continue heating 
Fan speed mode (indoor fan): Hi	Operates at "Hi" regardless of the room temperature.	Set to "ultra-Hi" when the compressor runs at maximum speed, and to "Hi" in other modes.		Set to "ultra-Lo", "Lo", "Med", "Hi", "ultra-Hi" or "stop" depending on the room temperature, and time. Set to "stop" if the room temperature is 18˚C in the "ultra-Lo" mode other than during preheating (cooling is recovered at 18.33˚C). Set to "ultra-Hi" when the compressor is running at maximum speed during hot dash or when recovered from defrosting.	
Fan speed mode (indoor fan): Med	Operates at "Med" regardless of the room temperature.	Same as at left.		Set to "ultra-Lo", "Lo", "Med" or "stop" depending on the room temperature and time. Set to "stop" if the room temperature is 18˚C in the "ultra-Lo" mode other than during preseating (cooling is recovered at 18.33˚C).	
Fan speed mode (indoor fan): Lo	Operates at "Lo" regardless of the room temperature.	Same as at left.	Set to "Lo" in modes other than when the compressor stops.	Set to "ultra-Lo", "Lo", or "stop" depending on the room temperature and time. Set to "stop" if the room temperature is 18˚C in the "ultra-Lo" mode other than during preseating (cooling is recovered at 18.33˚C). The fan speed is controlled by the heat exchanger temperature; the overload control is executed as in the following diagram: 	
Fan speed mode (indoor fan): Silent	Operates at "Silent" regardless of the room temperature.	Same as at left.	Set to "Silent" in modes other than when the compressor stops.		
Basic operation of temperature controller	Performs only fan operation at the set speed regardless of the room temperature. 	See page 37.	See page 39.	See page 41.	
Sleep operation (with sleep button ON)	• Enters sleep operation after set as on the left. • Action during sleep operation Lo (sleep) operation	• Same as at left • See page 39.	• Same as at left • See page 39.	• Same as at left • See page 45.	• Same as at left. • Performs the sleep operation of each operation mode.

Mode data file

	RAS-25JX5	RAS-35JX5
LABEL NAME	**VALUE**	
WMAX	3800 min-1	4500 min-1
WMAX2	3800 min-1	4500 min-1
WSTD	3150 min-1	3900 min-1
WJKMAX	2800 min-1	3300 min-1
WBEMAX	2500 min-1	2800 min-1
WSZMAX	2500 min-1	2800 min-1
CMAX	3300 min-1	3800 min-1
CMAX2	3300 min-1	3800 min-1
CSTD	2050 min-1	3150 min-1
CJKMAX	1800 min-1	2200 min-1
CBEMAX	1600 min-1	1700 min-1
CSZMAX	1600 min-1	1700 min-1
CKYMAX__TY1	2050 min-1	3000 min-1
CJKMAX__TY1	1800 min-1	2200 min-1
CBEMAX__TY1	1600 min-1	1700 min-1
CSZMAX__TY1	1600 min-1	1700 min-1
SDMAX	1600 min-1	1700 min-1
SDRPM	1400 min-1	1400 min-1
WMIN	800 min-1	800 min-1
CMINHI	1400 min-1	1400 min-1
CMIN	1400 min-1	1400 min-1
DMIN	1400 min-1	1400 min-1
STARTMW	60 Seconds	60 Seconds
STARTMC	90 Seconds	90 Seconds
STARTMD	90 Seconds	90 Seconds
DWNRATEW	80%	80%
DWNRATEC	80%	80%
SHIFTW	0.00 ℃	0.00 ℃
SHIFTC	0.66 ℃	0.66 ℃
CLMXTP	30.00 ℃	30.00 ℃
YNEOF	25.00 ℃	25.00 ℃
TEION	2.00 ℃	2.00 ℃
TEIOF	9.00 ℃	9.00 ℃
SFTDSW	1.00 ℃	1.00 ℃
DFTIM1	43 Minutes	43 Minutes
DFTIM2	60 Minutes	60 Minutes

Basic Cooling Operation



Notes:

(1) Condition for entering into Cool Dashed mode. When fan set to "Hi" or "Auto mode" and temperature difference between indoor temperature and set temperature has a corresponding compressor rpm (calculated value in Table 2) larger than CMAX.

(2) Cool Dashed will release when i) a maximum 25 minutes is lapsed and ii) room temperature is lower than set temperature –3°C (thermo off) and iii) when room temperature has achieved setting temperature –1°C then maximum Cool Dashed time will be revised to 20 minutes. And iv) indoor fan is set to Lo and Med fan mode and v) change operation mode.

(3) During Cool Dashed operation, thermo off temperature is set temperature (with shift value) –3°C. After thermo off, operation continue in Fuzzy control mode.

(4) Compressor minimum "ON" time and "OFF" time is 3 minutes.

(5) During normal cooling mode, compressor maximum rpm CMAX will maintain for 60 minutes if indoor temperature is lower than CLMXTP. No time constrain if indoor temperature is higher than CLMXTP.

(6) When fan speed setting on remote control is "Hi" or "Auto" mode, and both room and outdoor temperatures (data based on out door unit) meet temperature judgment (Off) shown in the table 1, the compressor rpm will be limited to CKYMAX_TY1.

(7) When fan is set to "Med", compressor rpm will be limited to CJKMAX.

(8) When fan is set to "Lo", compressor rpm will be limited to CBEMAX.

(9) When fan is set to "Silent", compressor rpm will be limited to CSZMAX.

(10) During Cool Dashed, when room temperature reaches set temperature –1°C compressor rpm is actual rpm x DWNRATEC.

Table 1 Thermo judgment

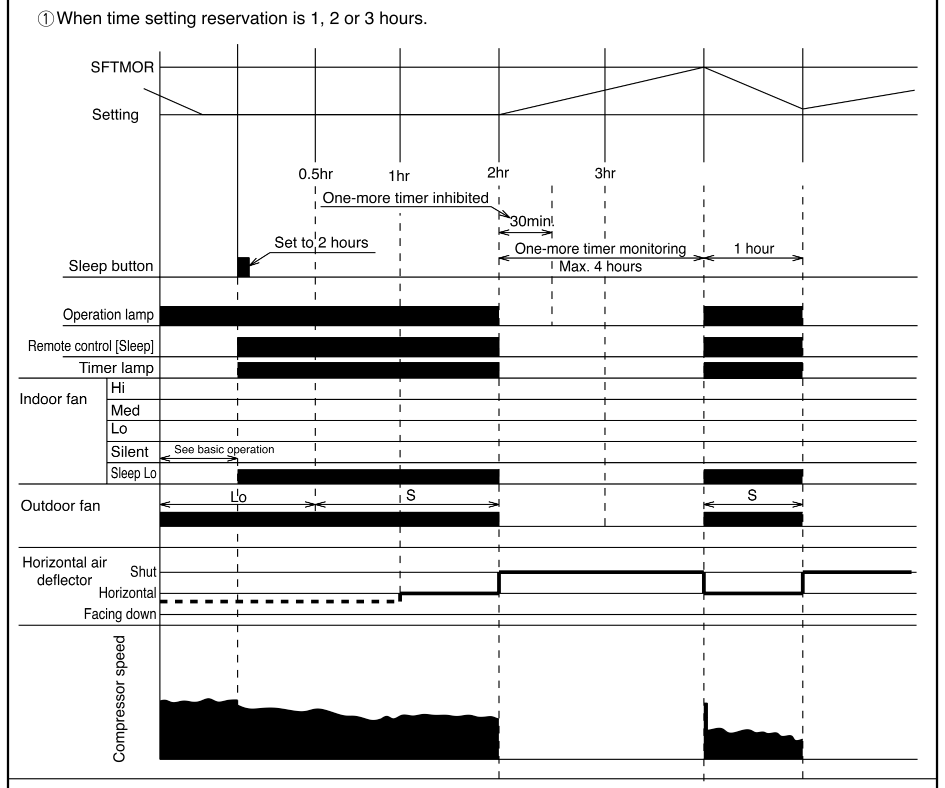
Item		Temperature
Room temperature	Thermo judgment (ON)	30°C
	Thermo judgment (OFF)	32°C
Outdoor temperature	Thermo judgment (ON)	31°C
	Thermo judgment (OFF)	33°C

Table 2 Compressor rpm

Calculated compressor rpm	Temperature difference (with shift value)
2500 min^{-1}	1.66°C
3000 min^{-1}	2.00°C

Cooling Sleep Operation · One-More Timer

① When time setting reservation is 1, 2 or 3 hours.

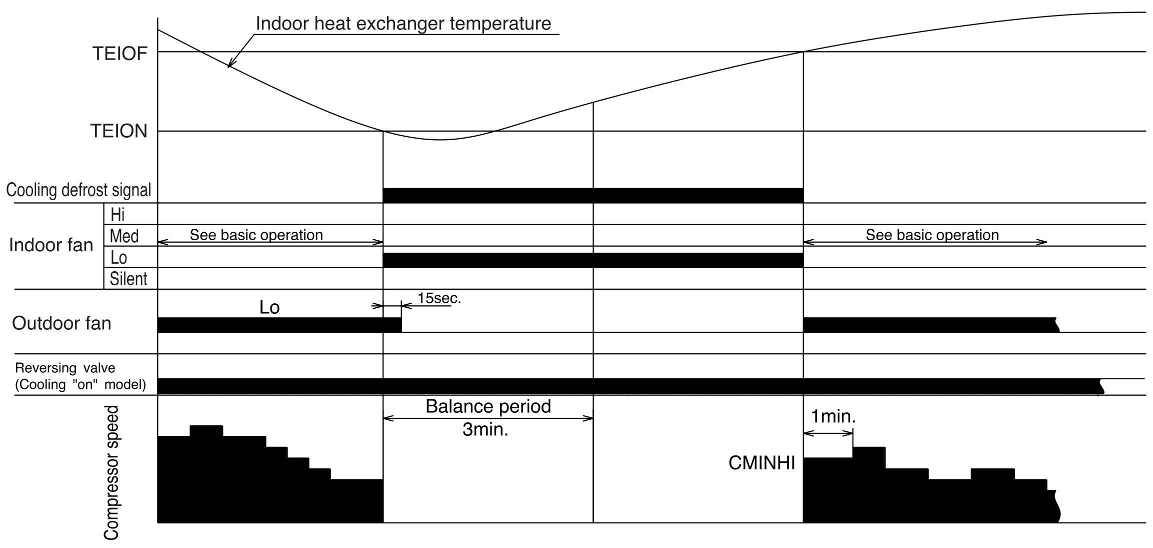


Notes:
(1) When the sleep button is set, the maximum compressor speed is limited to CSZMAX and the indoor fan is set to "Sleep Lo" (FCSOY).
(2) The indoor fan speed does not change even when the fan speed mode is changed.
(3) If operation mode is changed during sleep operation, all data including set temperature and time are cleared and the operation newly starts.
(4) When the operation is stopped while the sleep operation is being performed, the set temperature at the time the operation is stopped is retained and the time count will be continued.
(5) When the set time is changed while the sleep operation is being performed, all data including set temperature and time are cleared and the operation newly starts.
(6) If the sleep operation is cancelled by the cancel button or sleep button, all data are cleared.
(7) The indoor fan stops during sleep operation or when thermo is off.
(8) One-more timer operation is performed only once.
(9) There is no shift in the set temperature by elapse of time.

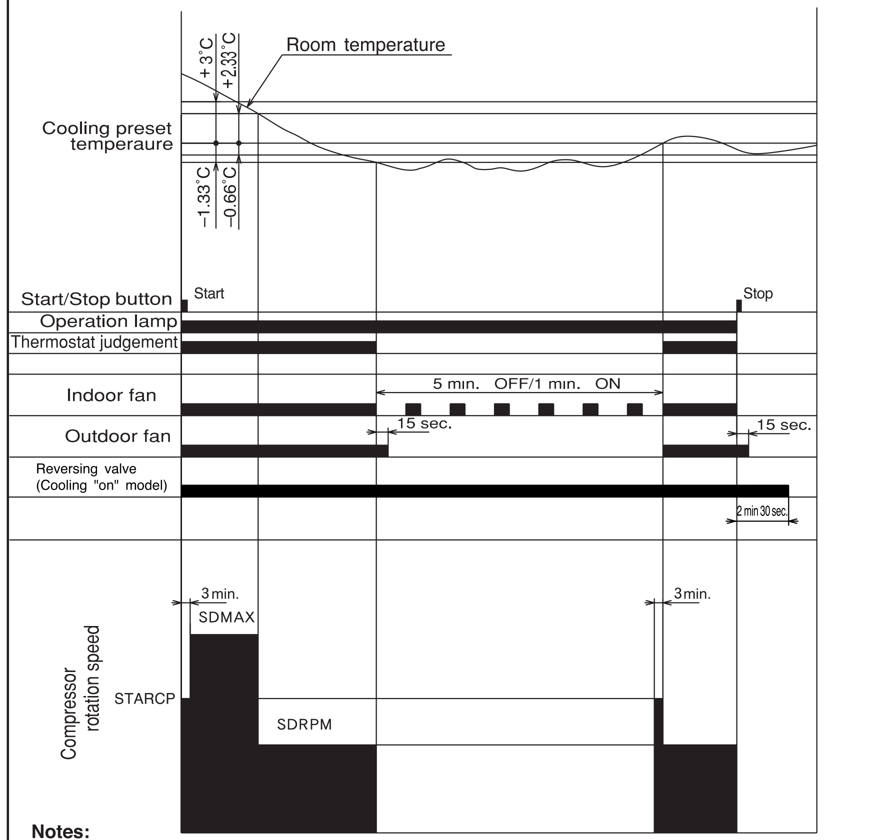
② In case of continuous timer operation

Notes:
(1) After sleep operation reservation is made, the operation is stopped in 3 hours time and then one-more timer operation is repeated for subsequent 4 hours.
(2) After one-more timer operation is stopped, the one-more timer operation is inhibited for 30 minutes.

Cooling Defrost

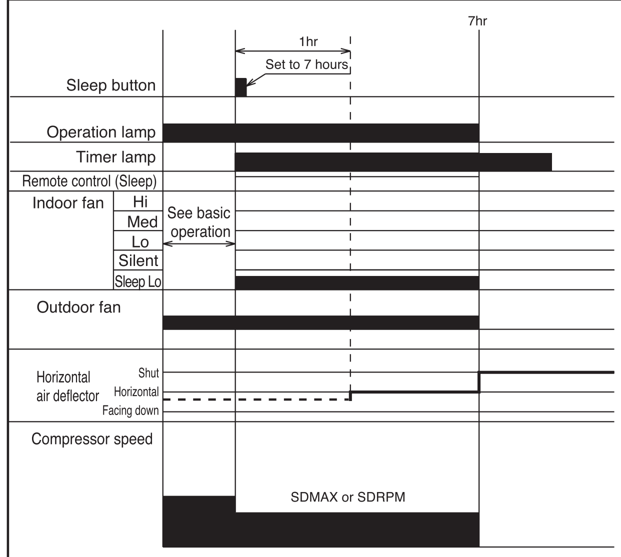


Dehumidifying Operation



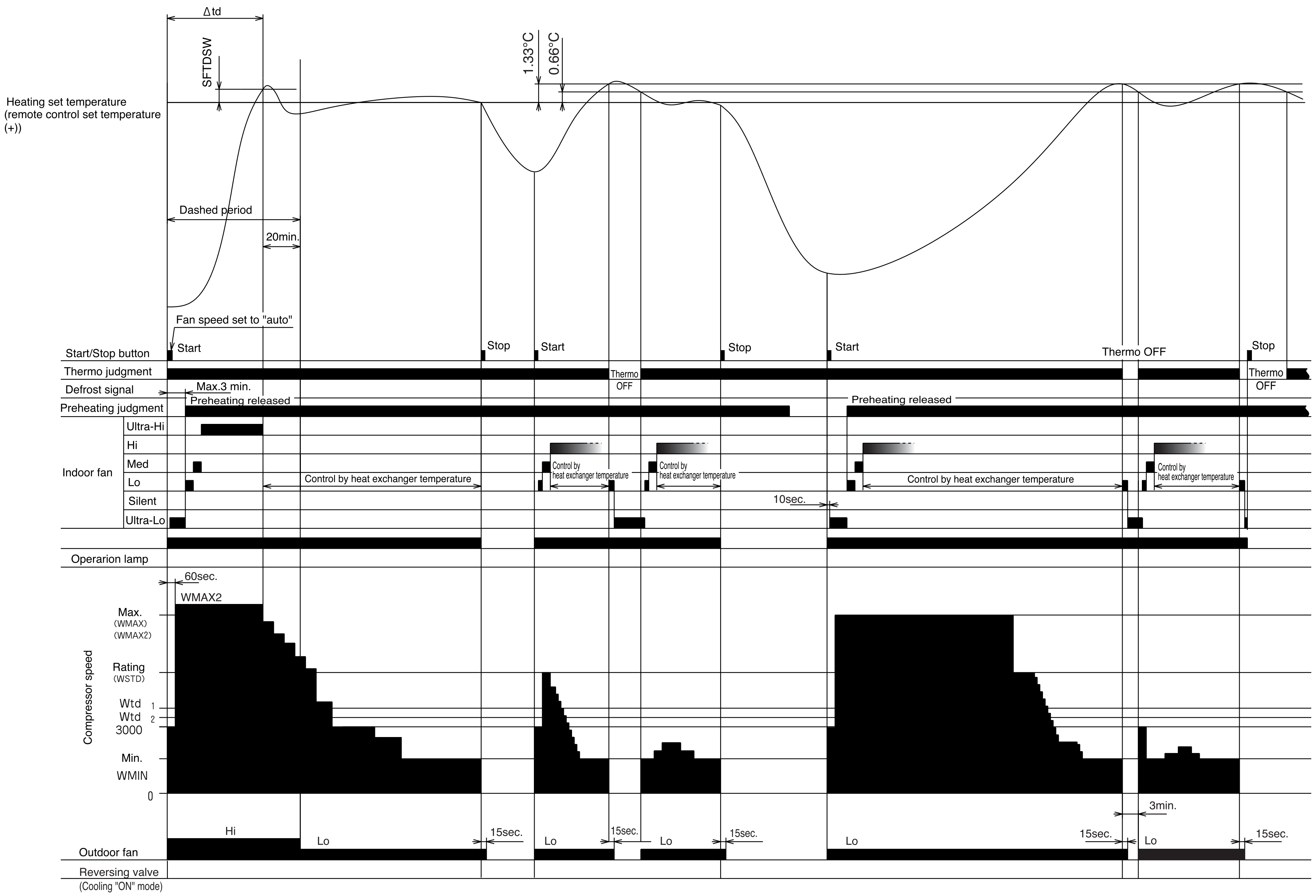
Notes:
(1) The operation is done assuming as the preset temperature
= (room temperature at the time) – (2˚C).
(2) The indoor fan is operated in the "Lo" mode. During thermo OFF indoor fan will be OFF for 5 minutes and ON for 1 minute.
(3) When the operation is started by the themostat turning ON, the start of the indoor fan is delayed 32 seconds after the start of compressor operation.
(4) The compressor is operated forcedly for 3 minutes after operation is started.
(5) The minimum ON time and OFF time of the compressor are 3 minutes.

Dehumidifying Sleep Operation



Notes:
(1) The sleep operation starts when the sleep button is pressed.
(2) When the sleep button is set, the indoor fan is set to "sleep Lo".
(3) The indoor fan speed does not change even when the fan speed mode is changed.
(4) If sleep operation is canceled by the cancel button or sleep button, all data is cleared.

Basic Heating Operation



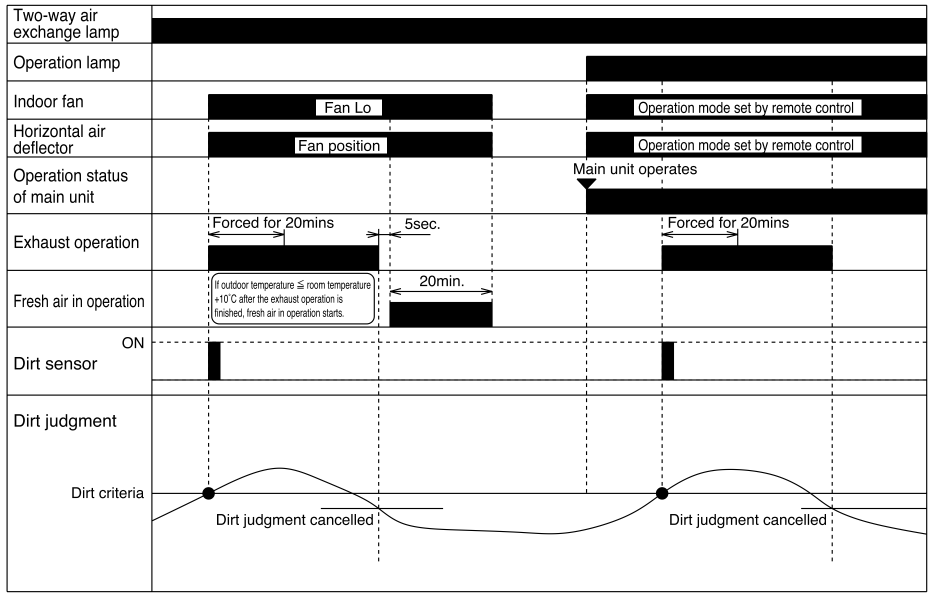
Notes:

(1) Condition for entering into Hot Dashed mode. When fan set to “Hi” or “Auto mode” and i) Indoor temperature is lower than 18°C, and ii) outdoor temperature is lower than 10°C, and iii) Temperature difference between indoor temperature and set temperature has a corresponding compressor rpm (calculated value in Table 3) larger than WMAX.
(2) Hot Dashed will release when i) Room temperature has achieved the set temperature + SFTDSW. ii) Thermo off.
(3) During Hot Dashed operation, thermo off temperature is set temperature (with shift value) +3°C. After thermo off, operation continue in Fuzzy control mode.
(4) Compressor minimum “ON” time and “OFF” time is 3 minutes.
(5) During normal heating mode, compressor maximum rpm WMAX will maintain for 120 minutes if indoor temperature is higher than 18°C. No time limit constrain if outdoor temperature is lower than 2°C or indoor temperature is lower than 18°C.
(6) During Hotkeep or Defrost mode, indoor operation lamp will blink at interval of 2 seconds “ON” and 1 second “light reducing” .
(7) When heating mode starts, it will enter into Hotkeep mode if indoor heat exchanger temperature is lower than YNEOF + 0.33°C.
(8) When fan is set to “Lo”, compressor rpm will be limited to WBEMAX. When fan is set to "Med", compressor rpm will be limited to WJKMAX. When fan is set to “Silent”, compressor rpm will be limited to WSZMAX.
(9) In “Ultra-Lo” fan mode, if indoor temperature is lower than 18°C, indoor fan will stop. If indoor temperature is higher than 18°C + 0.33°C, fan will continue in “Ultra-Lo” mode. During Hotkeep or Defrost mode, fan will continue in “Ultra-Lo” mode.
(10) During Hot Dashed, when room temperature reaches set temperature + SFTDSW compressor rpm is actual rpm x DWNRATEW.

Table 3 Compressor rpm

Calculated compressor rpm	Temperature difference (with shift value)
1450 min^{-1}	1.66°C
1950 min^{-1}	2.00°C
2450 min^{-1}	2.33°C
2950 min^{-1}	2.66°C
3450 min^{-1}	3.00°C

Automatic Two Way Air Exchange Mode



Notes:

(1) Two way air exchange operation is performed automatically when dirty air is detected by setting “Automatic Two Way Air Exchange”.

(2) Exhaust operation is performed until the air becomes clean. Forced operation is performed for 20 minutes. The maximum exhaust period is 5 hours.

(3) If outdoor temperature ≦ room temperature +10˚C at the time the exhaust operation is finished, fresh air in operation is performed for 20 minutes.

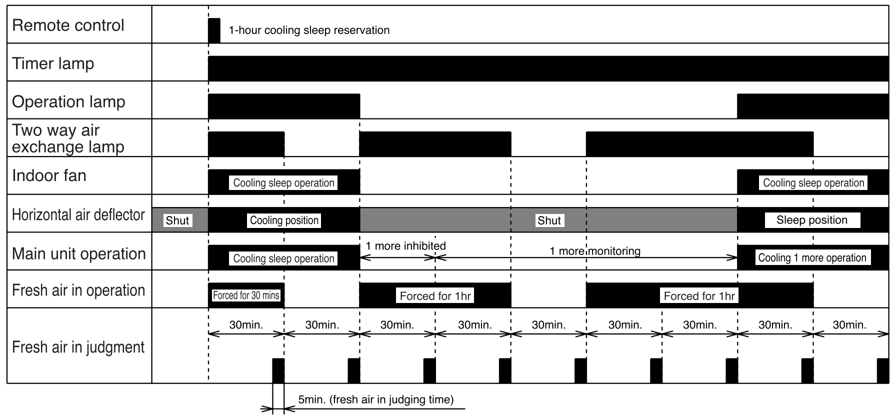
(4) If Air Monitor operation is performed while the air conditioner is stopped, the air conditioner runs at the fan operation mode while exhaust and fresh air in operations are performed.

(5) If Air Monitor operation is performed while the air conditioner is in operation, the air conditioner runs according to the operation mode selected by the remote control while exhaust and fresh air in operations are performed. At this time, the operation lamp is lit.

(6) “Automatic Two Way Air Exchange” is inhibited for 8 hours after sleep operation reservation is made.

(7) “Automatic Two Way Air Exchange” setting will be cancelled automatically after 14 days have elapsed since the setting is made.

Fresh Air In During Sleep Mode



Notes:

(1) When the sleep operation (including 1 more timer operation) is performed while the “Fresh Air In During Sleep Mode” is set, the fresh air in operation is performed. (Fresh air in during sleep mode is inhibited while operating exclusive two way air exchange and heating.)

(2) Forced fresh air in operation is performed for 30 minutes after sleep operation reservation is made.

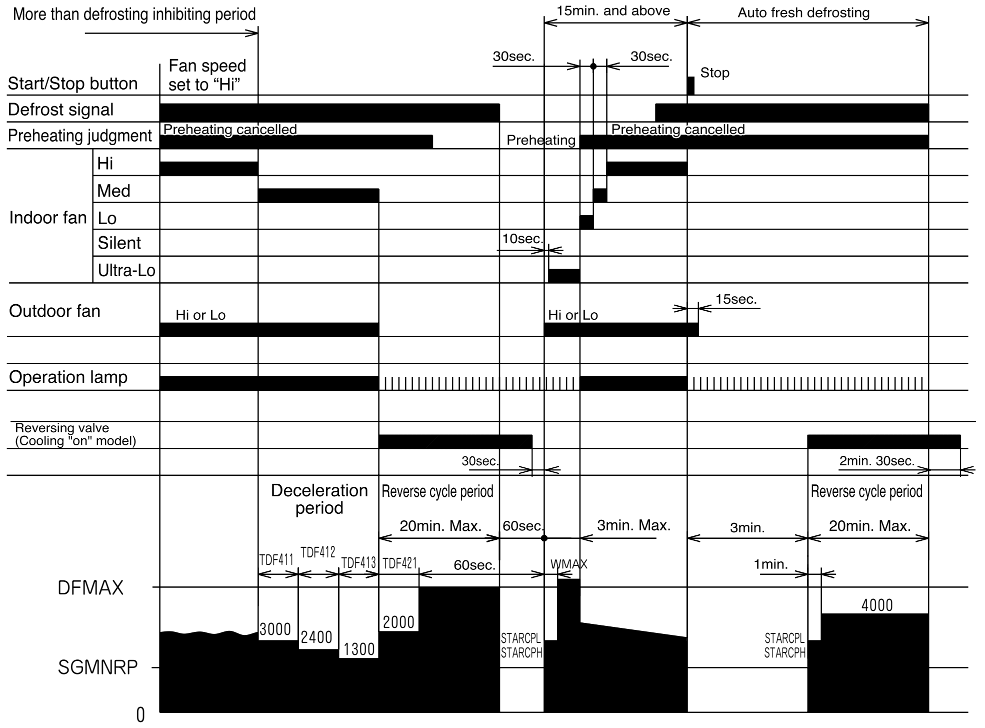
(3) Judgment of the following fresh air in inhibiting conditions is made every 30 minutes after sleep operation reservation is made.

(a) Outdoor temperature ≧ Room temperature +1˚C.

(b) Room temperature ≦ Set temperature -2˚C

(4) Two way air exchange fan operates at the sleep tap.

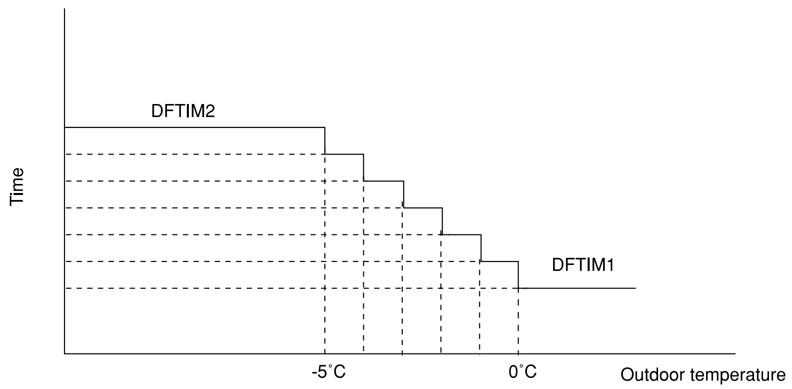
Reversing Valve Defrosting



Notes:

(1) The defrosting inhibit period is set as shown in the diagram below. When defrosting has finished once, the inhibit period is newly set, based on the outdoor temperature when the compressor was started. During this period, the defrost signal is not accepted.
(2) If the difference between the room and outdoor temperature is large when defrosting is finished, the maximum compressor speed (WMAX) or (WMAX2) can be continued for 120 minutes maximum.
(3) The defrosting period is 20 minutes maximum.
(4) When operation is stopped during defrosting, it is switched to auto refresh defrosting.
(5) Auto refresh defrosting cannot be engaged within 15 minutes after operation is started or defrosting is finished.

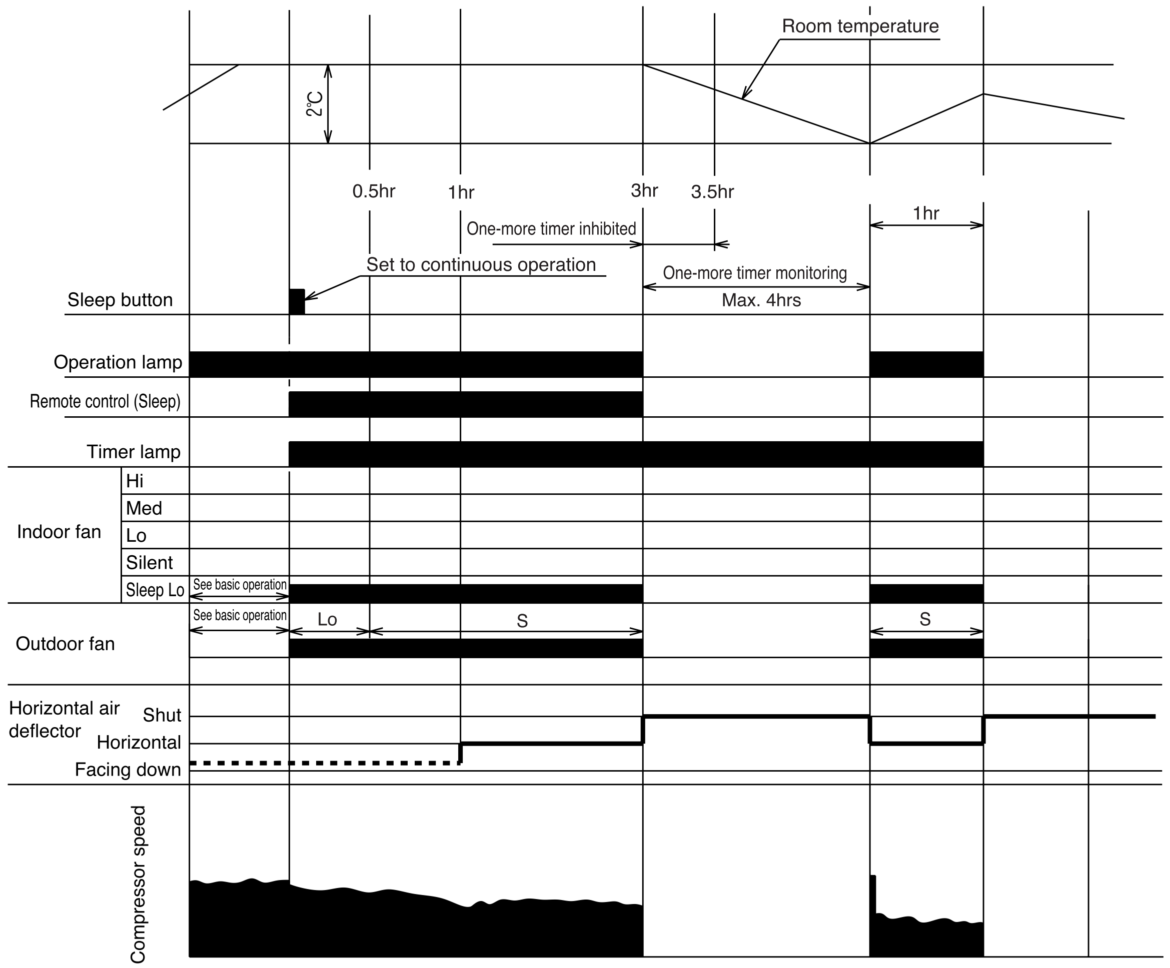
Setting Defrosting Inhibit Period



Notes:

(1) The time is set according to the outdoor temperature when it is between 0˚C and -5˚C.
(2) DFTIM1 is used when the outdoor temperature ≧ 0˚C.
(3) DFTIM2 is used when the outdoor temperature ≦ -5˚C.

Heating Sleep Operation · One-More Timer



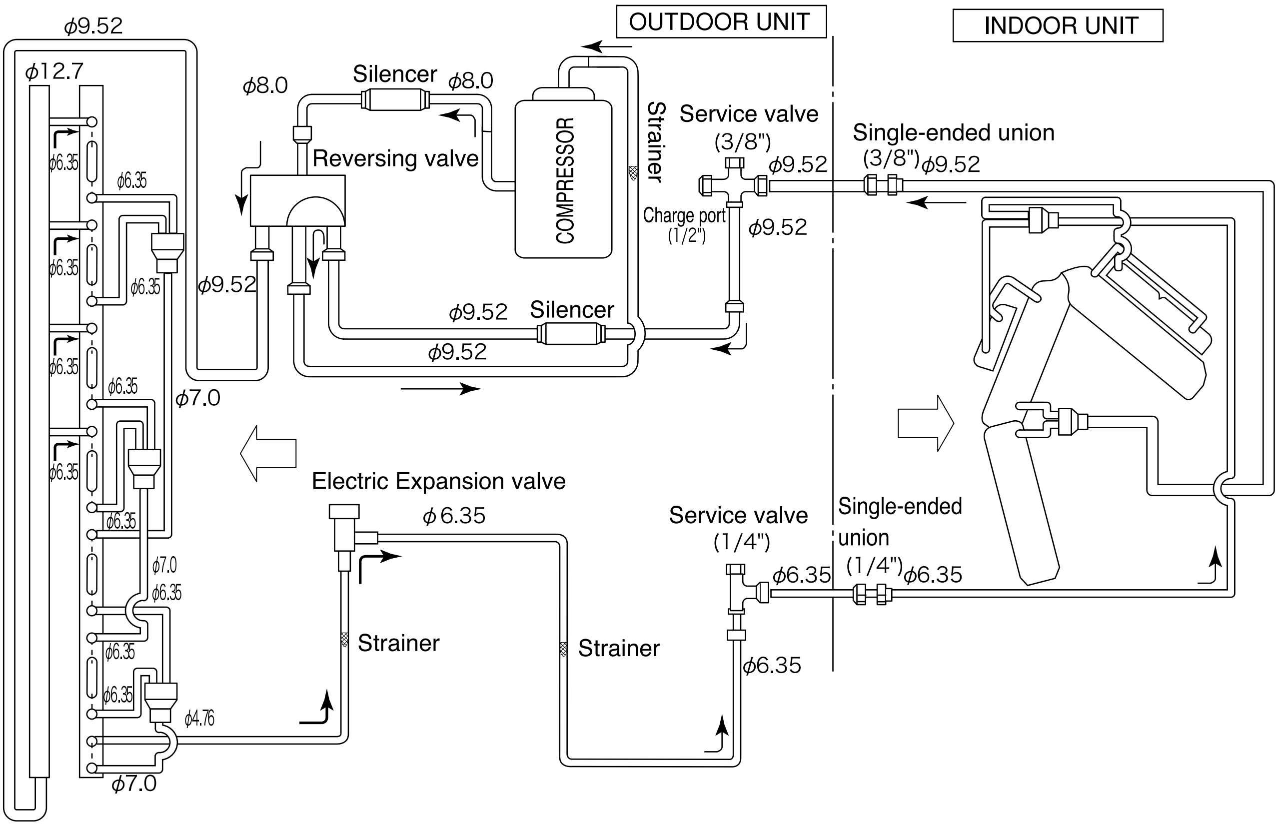
Notes:

(1) The sleep operation starts when the sleep button is pressed.
(2) When the sleep button is set, the maximum compressor speed is limited to WSZMAX and the indoor fan is set to "Sleep Lo" (FWSOY).
(3) If operation mode is changed during sleep operation, the operation is changed from the time the change was made and the sleep control starts.
(4) The indoor fan speed does not change even when the fan speed mode is changed.
(5) If defrosting is set during sleep operation, defrosting is performed and the sleep operation is resumed when the defrosting is finished.
(6) When the operation is stopped while the sleep operation is being performed, the set temperature at the time the operation is stopped is retained and the time count will be continued.
(7) When the set time is changed while the sleep operation is being performed, all data including set temperature and time are cleared and the operation newly starts.
(8) If the sleep operation is cancelled by the cancel button or sleep button, all data are cleared.
(9) There is no shift in the set temperature by elapse of time.
(10) One-more timer operation is not performed in case of time setting reservation of 1, 2 or 3 hours.

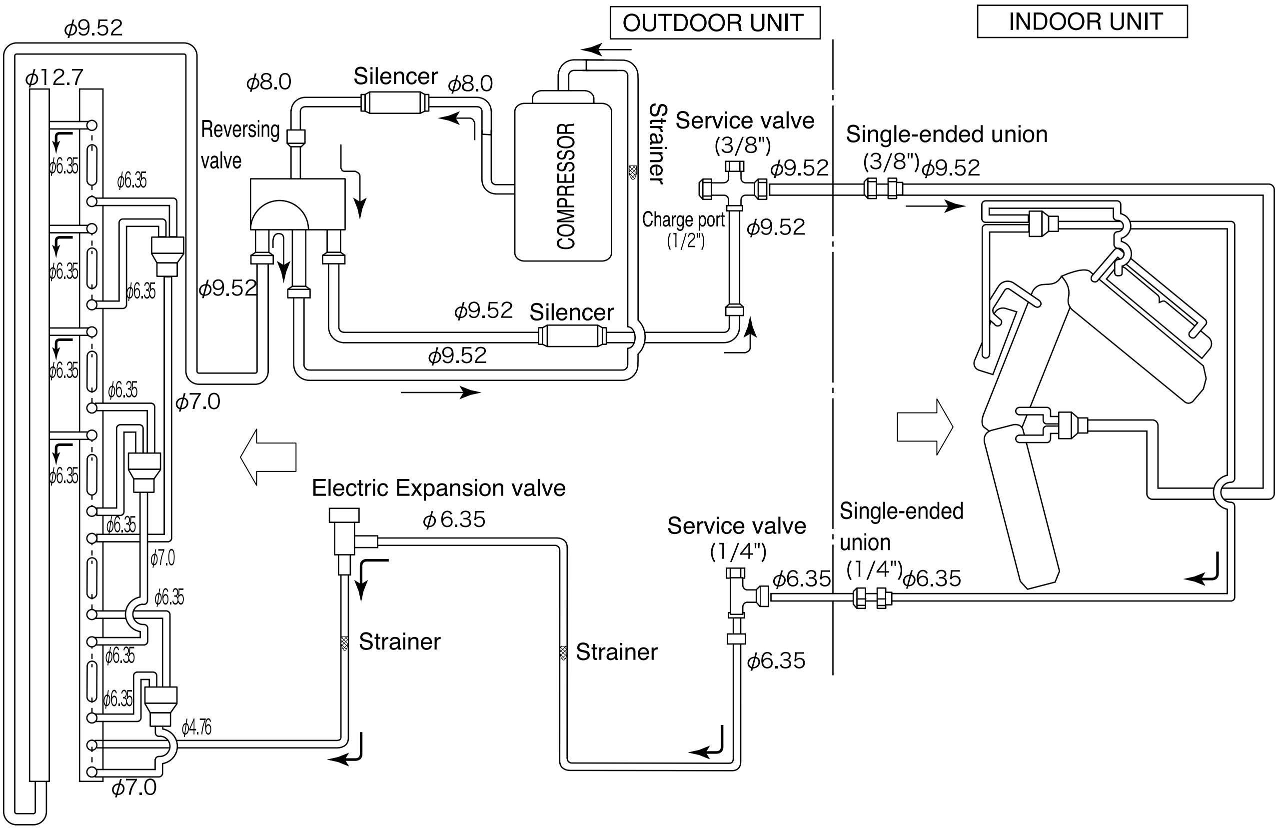
REFRIGERATING CYCLE DIAGRAM

MODEL RAS-25JX5 / RAC-25JX5
RAS-35JX5 / RAC-35JX5

COOLING・DEHUMIDIFYING・DEFROSTING



HEATING



DESCRIPTION OF MAIN CIRCUIT OPERATION

MODEL RAS-25JX5, RAS-35JX5

1. Reset Circuit

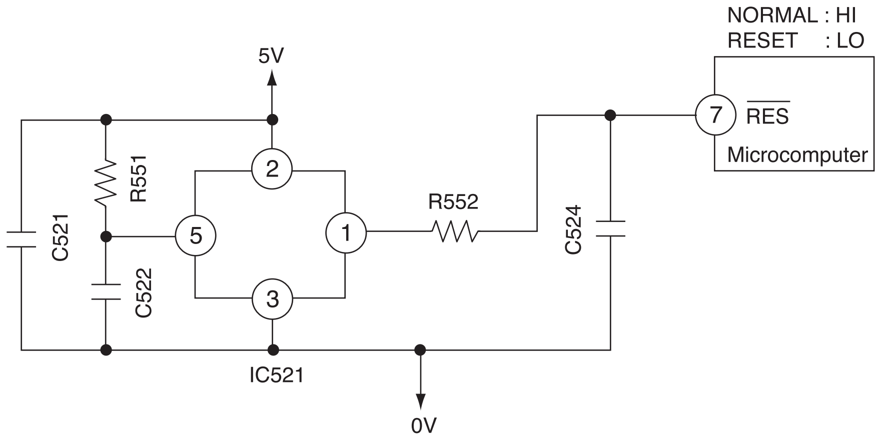


Fig. 1-1

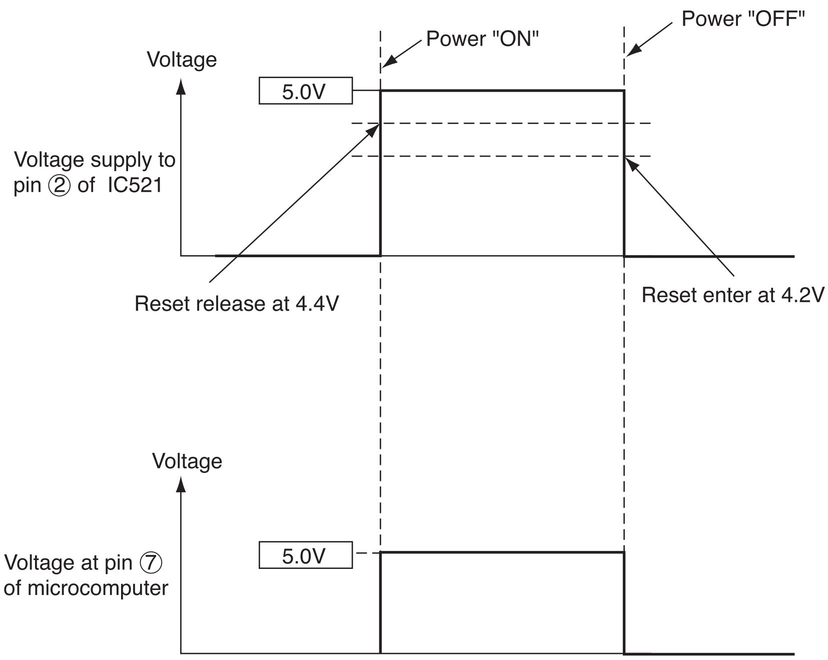


Fig. 1-2

The reset circuit initializes the microcomputer program when power is ON or OFF.
Low voltage at pin ⑦ resets the microcomputer and Hi activates the microcomputer.
When power "ON" 5V voltage rises and reaches 4.4V, pin ① of IC521 is set to "Hi". At this time the microcomputer starts operation.
When power "OFF" voltage drops and reaches 4.2V, pin ① of IC521 is set to "Low". This will RESET the microcomputer.

2. Receiver Circuit

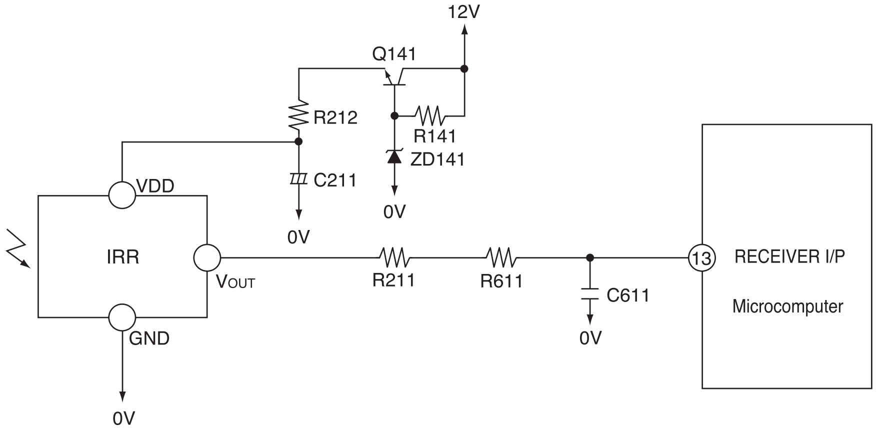


Fig.2-1

IRR (light receiving unit)receives the infrared signal from the wireless remote controller. The receiver amplifie and shapes the signal and outputs it.

3. Buzzer Circuit

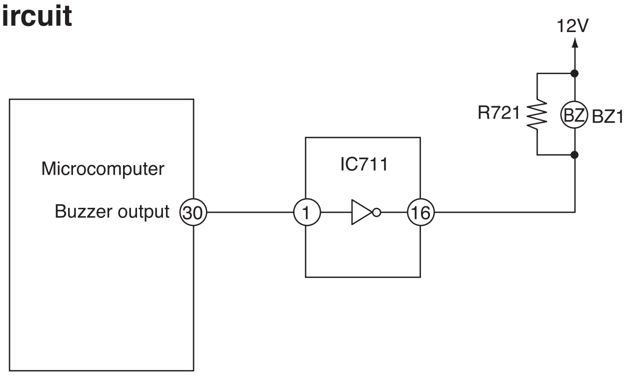


Fig.3-1 Buzzer circuit

When the buzzer sounds, an approx 3.9kHz square signal is output from buzzer output pin ㉚ of the microcomputer. After the amplitude of this signal has been set to 12Vp-p by IC711, it is applied to the buzzer. The piezoelectric element in the buzzer oscillates to generate the buzzer's sound.

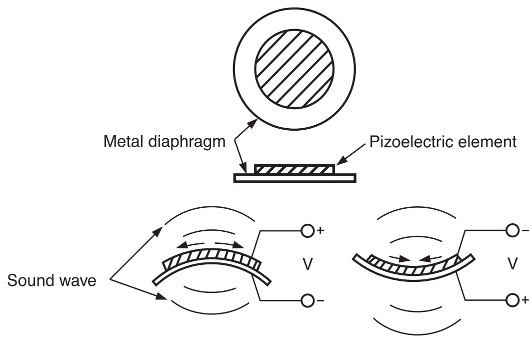


Fig. 3-2 Buzzer Operation

4. Snap Motor Circuit (Horizontal Air Deflector, Ventilation Damper)

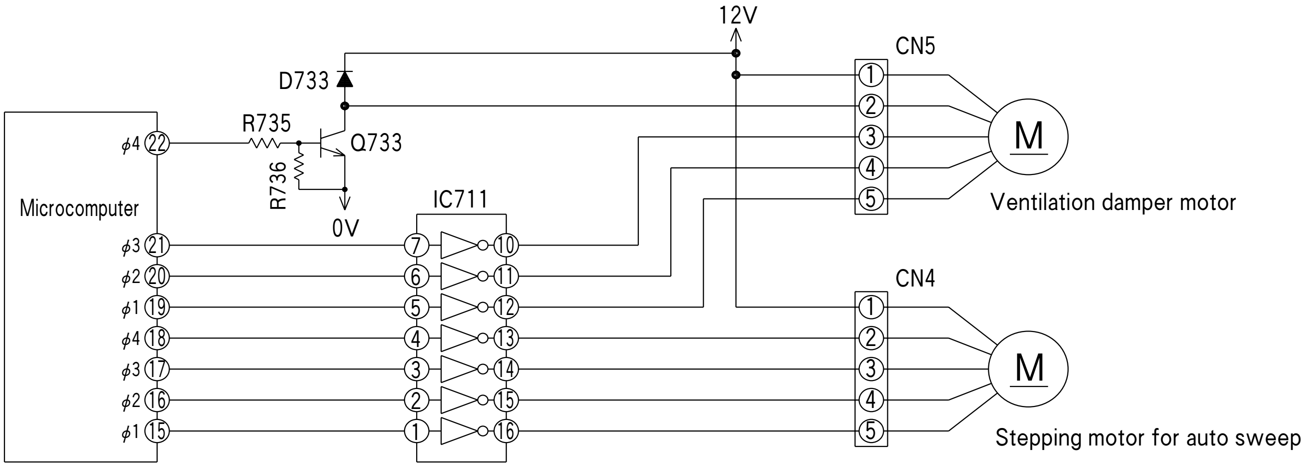


Fig.4-1

Fig. 4-1 shows the Auto sweep motor drive circuit; the signals shown in Fig.4-2 are output from pin ⑮ - ㉒ of microcomputer.

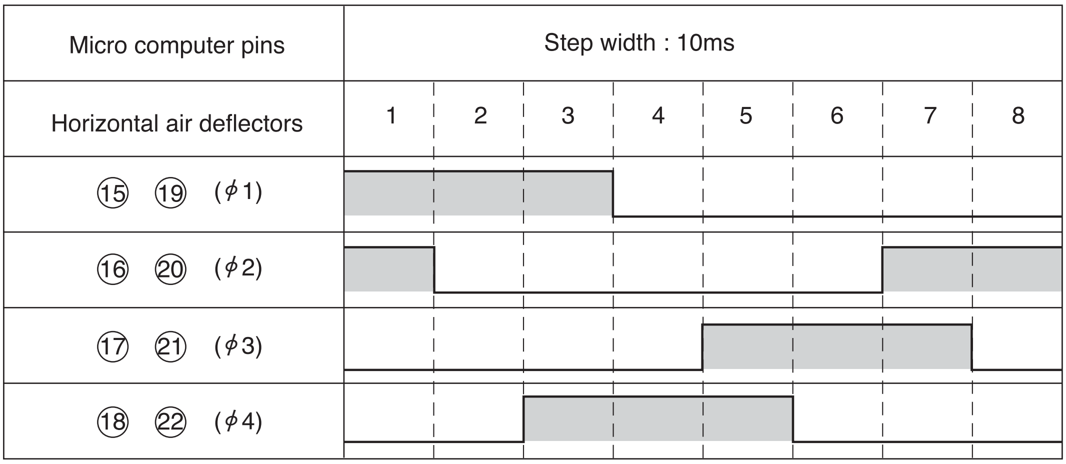


Fig.4-2 Microcomputer Output Signals

As the microcomputer's outputs change as shown in Fig.4-2, the coils of the auto sweep motor is excite to turn the rotor. Table 4-1 shows the rotation angle of Horizontal Air Deflector, Ventilation Damper.

Table 4-1 Auto sweep Motor Rotation

	Rotation angle per step (˚)	Time per step (ms.)
Horizontal air deflectors Ventilation Damper	0.0882	10

5. Initial Setting Circuit (IC401)

- When power is supplied, the microcomputer reads the data in IC401(E2PROM) and sets the preheating activation value and the rating and maximum speed of the compressor, etc. to their initial values.
- Data of self-diagnosis mode is stored in IC401; data will not be erased even when power is turned off.

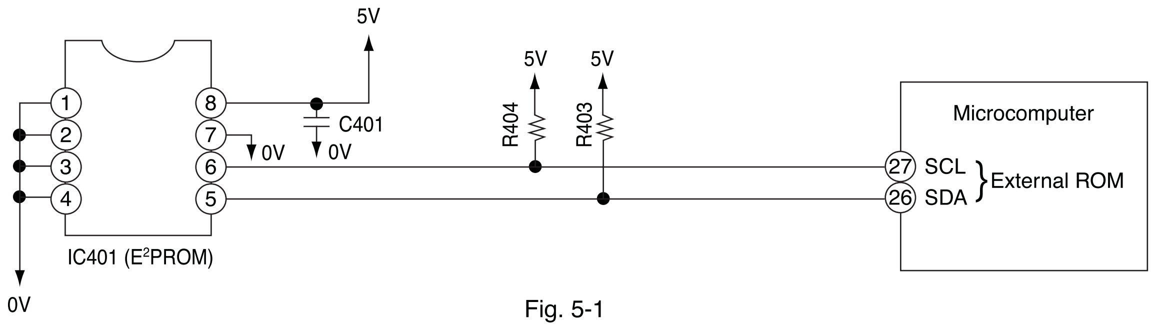


Fig. 5-1

6. Power Supply

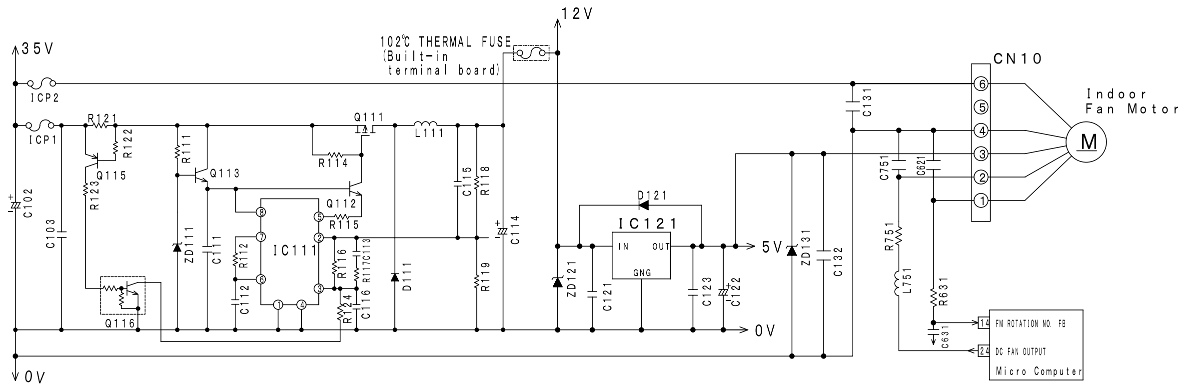


Fig. 6-1

First, 35V power which operates the indoor unit is generated by the power source section of the outdoor unit and supplied to the indoor unit through the C and D lines of the connecting cable.
Second, use the DC/DC converter and the 35 V power supply from the outdoor unit to generate 12 V control power, which drives the stepping motor during the operation.
In addition, use the regulator IC 121 to generate 5 V power required for driving the micro computer and controlling fan motor.
If the terminal block was overheated due to a connecting cable improper connection, the thermal fuse built in the terminal block will burnt to shut off the 12 V line and stop the operation of the indoor unit. Then, the outdoor unit cannot be communicated with the indoor unit and a communication error occurs (the outdoor LD301 will blink 9 times), stop all operations.

7. Fan Motor Drive Circuit

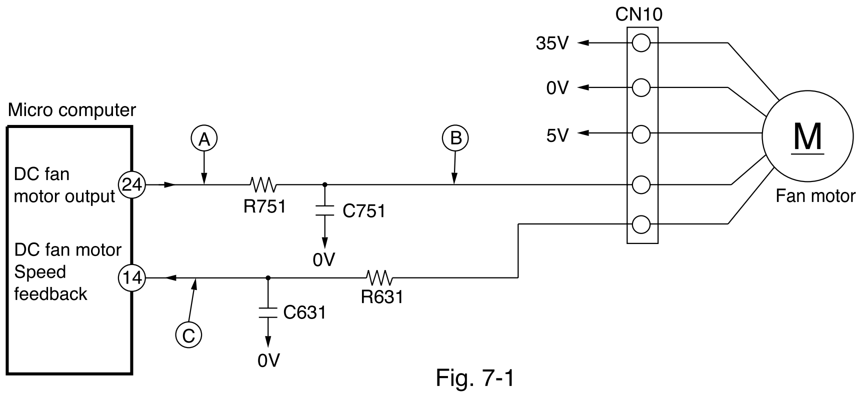


Fig. 7-1

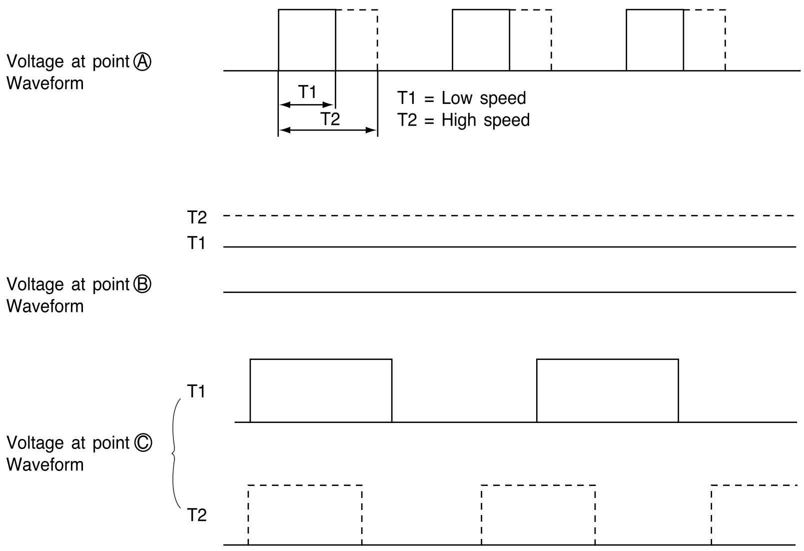


Fig. 7-2

- For the point Ⓐ, 15.7 kHz PWM pulse will be output from the pin ㉔ on the micro computer as shown in Fig. 7-2. The pulse range will vary with different command speed.
- The pulse is converted into the analog voltage by the R751 and C751 and applied to the fan motor as the speed command voltage.
  Fig. 7-3 shows the relation between the voltage at the point Ⓑ and the speed. (Some differences will occur due to the condition of the unit.)
- The fan motor outputs the feedback pulse of the speed, which is input into the pin ⑭ on the micro computer.
  This pulse is equivalent to a frequency of 12/60 speed. (Example: 1000 min^{-1} x 12/60 = 200 Hz)
  The micro computer monitors the frequency and adjusts the output pulse range of the pin ㉔ so as to keep the command speed.

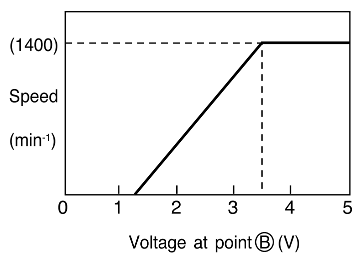


Fig. 7-3

- If the feedback pulse is 100 min^{-1} or less due to a locked fan motor or failure, the fan output will be stopped temporarily as fan lock error. After 10 seconds, restart the output of the pulse. If fan lock error is detected twice within 30 minutes, all units are stopped and the unit will come in the failure mode. (The timer lamp will blink 10 times.)

8. Ventilation Fan Motor Circuit

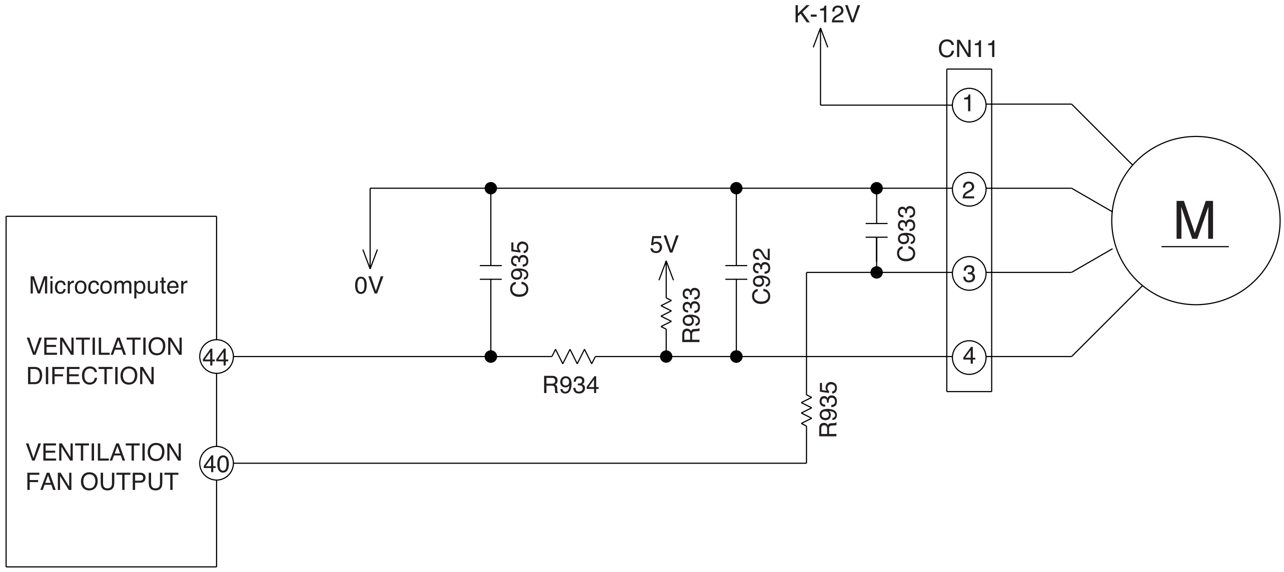


Fig. 8-1

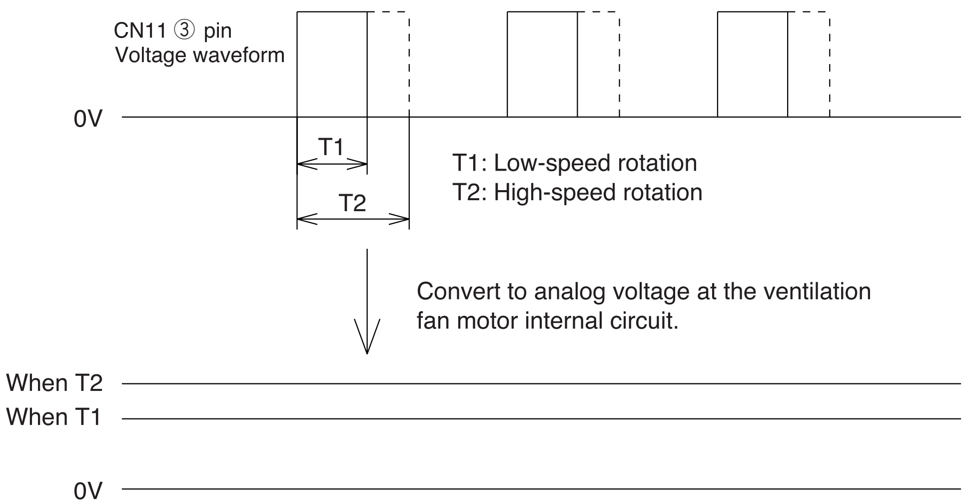


Fig. 8-2

- Ventilation fan motor is a 12V DC motor. It operates by inputting DC12V power (K-12V) and ventilation fan PWM signal to CN11① pin and CN11③ pin respectively and outputting ventilation abnormality detection signal from CN11④ pin.
- (K-12V) is generated from DC-DC converter of the ventilation fan motor circuit. It is the power source exclusively for the ventilation fan motor and is independent from 12V of the power circuit for control.
- Ventilation fan PWM signal (Microcomputer ㊵ pin) is a command instruction to the ventilation fan motor. This signal is converted into analog voltage inside the ventilation fan motor to operate it.
  If width of PWM signal is made wider, analog voltage becomes higher and the motor rotation speed becomes faster, as shown in Fig. 8-2.
- When the motor is rotating normally, the ventilation abnormality detection signal is Lo (approximately 0V). In the event that the fan is locked or unable to rotate due to failure, “Hi” ventilation abnormality detection signal (approximately 5V) is output (Microcomputer ㊹ pin) to show abnormality.
  When the Microcomputer receives this signal, it suspends ventilation fan PWM signal and outputs the same signal again after 30 seconds have elapsed. If the abnormality continues and retry is repeated 5 times within 3 minutes since the first abnormality detection, abnormality is judged and two way air exchange lamp blinks (lit for 4 seconds and off for 1 second).

9. Dirt Sensor (Gas Sensor) Circuit

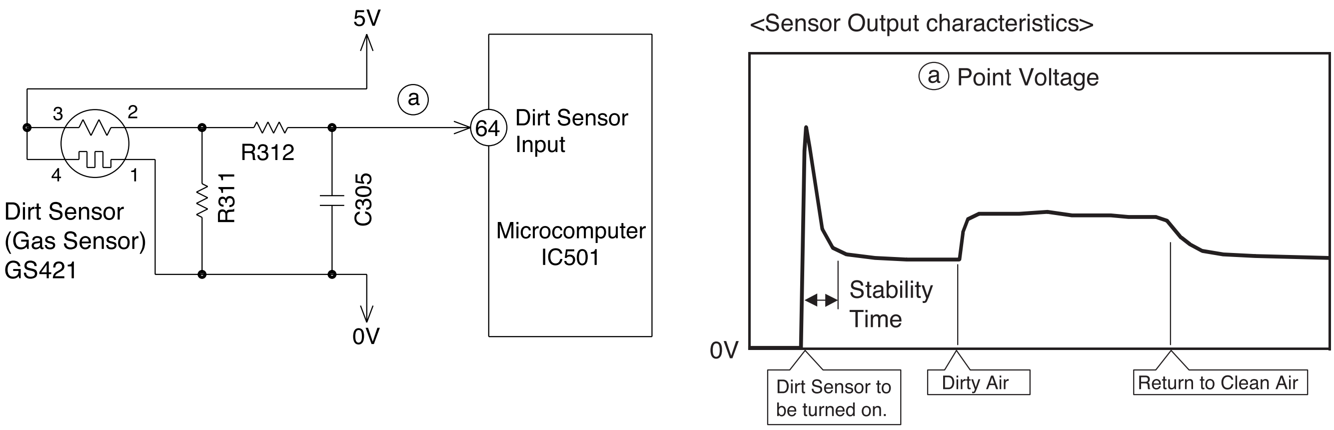


Fig. 9-1

- The Dirt Sensor(Gas Sensor) works by making use of the change of resistance value which occurs with the gas-sensing element heated by the heater, depending upon the dirtiness of the air (gas).
  (When the dirty air is detected, the resistance value of the sensor changes to be lower.)

- When electricity is turned on to the heater of the Dirt Sensor, the sensor will be in a useable mode. Due to the characteristics of the sensor, it takes up to some several minutes before the temperature of the inner heater rises and the conditions of the gas-sensing element become stable.
  (Time varies, depending upon how the sensor is used.)

- When the Dirt Sensor detects the dirtiness of the air, the resistance value of the sensor changes, and the voltage of the Dirt Sensor Input of the microcomputer (IC501) becomes higher.
  By this, the microcomputer recognizes the air being dirty, and by detecting the drop of the voltage, it also recognizes that the air has turned clean again.

- As the output voltage of the Dirt Sensor will change delicately even in the conditions of clean air, depending upon temperature, humidity and the flow of the air etc., the detection of the dirtiness of the air is done by observing the change of the voltage per hour.

1. The electrical parts for the outdoor unit is composed of two P.W.B. (a power P.W.B. and main P.W.B.) and a harmonics improvement circuit as shown in Fig. 1-1.

- MAIN P.W.B.
  This P.W.B. is equipped with the rectification diode, DC fan motor control circuit and the circuits around the micro computer which take various controls.

- POWER P.W.B.
  This P.W.B. is equipped with the noise filter, ICP power circuit, interface circuit, smoothing capacitor, expansion valve control circuit and four-way valve control circuit.

- HARMONICS IMPROVEMENT CIRCUIT
  This circuit is composed of the capacitor at the bottom of the electrical parts box and two reactors attached to the BULKHEAD.

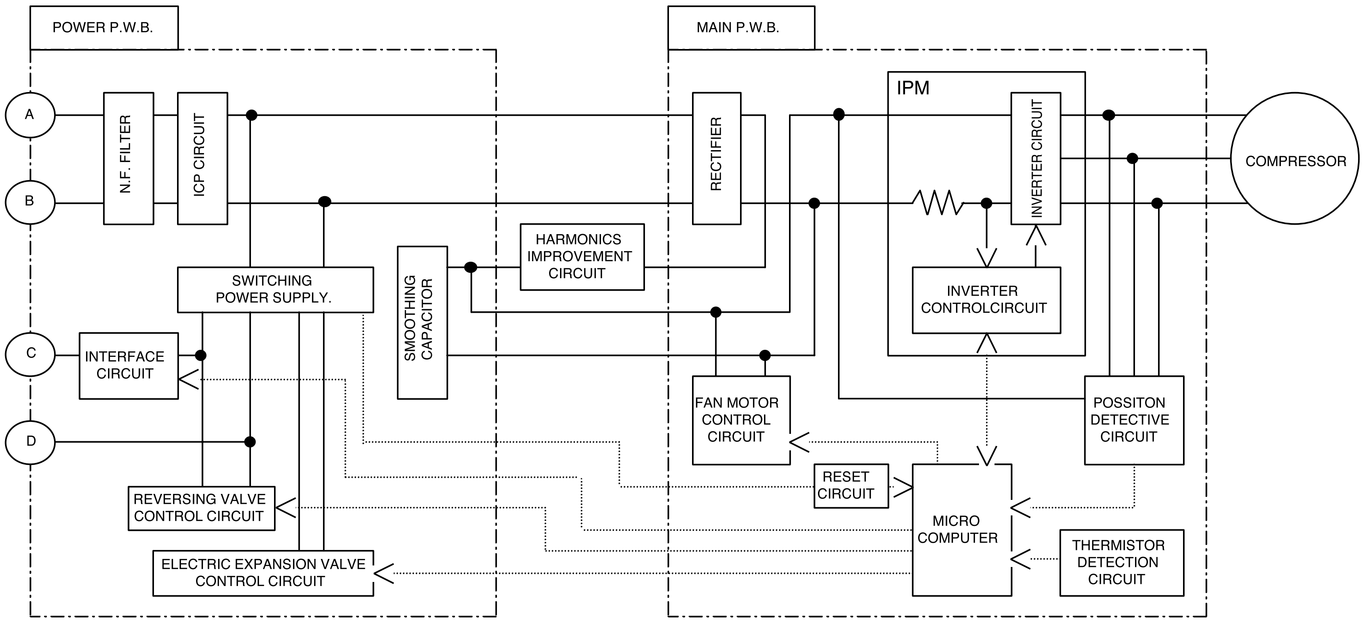


Fig. 1-1

2. Power circuit

This circuit is to convert the power from AC which is provided from the terminal A and B to DC voltage And produces an AC current which does not exceed the harmonic amplitude limit of the IEC61000-3-2. When the compressor is stopped, the AC voltage becomes about 300 V and while the compressor operates, it is about 280 V.

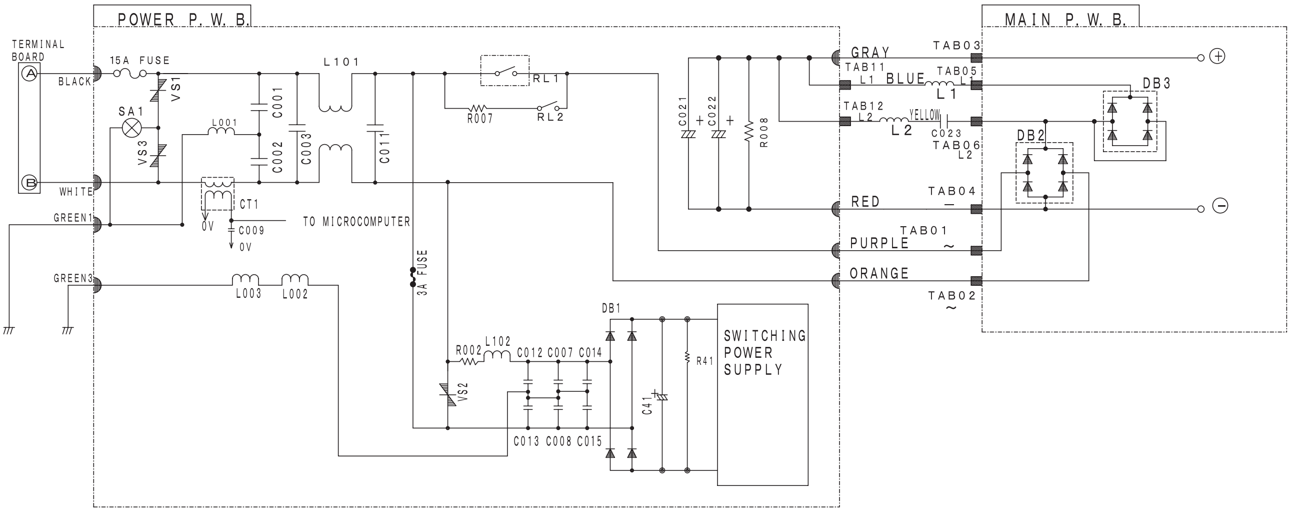


Fig. 2-1

Main parts

(1) DB2

The DB2 rectifies the AC voltage.

The possible causes for the DB2 failure are as follows. The 15 A fuse may be blown out or the IPM for the main P.W.B. may have a failure. In such a case, check the 15 A fuse for blowout and replace the main P.W.B. if necessary.

(2) DB3, L1, C023 and L2

The DB3, L1, C023 and L2 shape waveform of the input current.

When the current runs through the L1 is taken for I1 and the current runs through the L2 is taken for I2 as shown in Fig. 2-2, I1 becomes an input current to the capacitor which peak value was crushed by the L1 and I2 becomes a resonance current which causes the LC resonance using the L2 and C023. By combining the I1 and I2, the input current from the main power shapes a waveform shown in the right side of Fig. 2-3, indicating that the waveform is similar to sine wave. The more the waveform is similar to the sine wave, the lower the harmonic current becomes.

If the C023 has any failure, the protection unit activates and the C023 in open mode. In such a case, replace the failed parts.

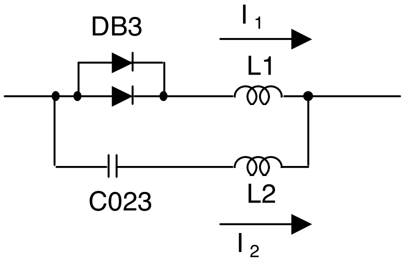


Fig. 2-2

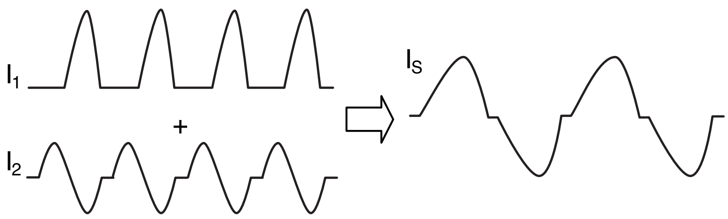


Fig. 2-3

(3) C021 and C022
This smoothes the voltage rectified for operating the compressor.
When the input voltage is taken for the sine wave as shown in the top of Fig. 2-4, it is rectified by the DB2 and becomes the waveform as shown in the middle of Fig. 2-4. After that, the voltage is smoothed by the C021 and C022, and becomes the waveform shown in the bottom of Fig. 2-4.

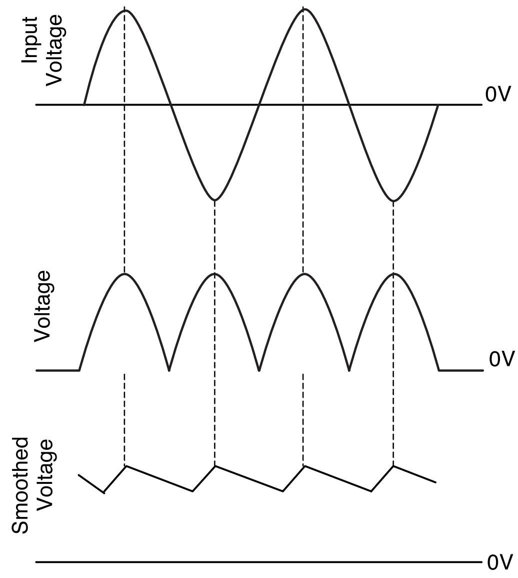


Fig. 2-4

(4) DB1 and C41
The DB1 rectifies the input voltage and the C41 smoothes it for the control power supply.
If the units above have any failure, the control power supply won't operate. In such a case, replace the power P.W.B.

(5) C001 to C003, C011, L101, and L102
They absorb electrical noise generated during operation of compressor, and also absorb external noise entering from power line to protect electronic parts.
Be sure to connect the earth cable between the indoor unit and the outdoor unit. Otherwise, the noise filter circuit won't operate properly.

(6) SA1 and VS1 to VS3
These surge absorber and varistors absorb external power surge such as induced thunder.
Be sure to connect the earth cable between the indoor unit and the outdoor unit. Otherwise, the surge absorber and the varistors won't operate.

(7) R002 and R007
The resistor R002 protects the rush current when the power is turned on while the resistor R007 protects the rush current when the compressor starts.
When the R002 has any failure, the control power supply won't operate. When the R007 has any failure and a strong rush current is generated, the DB2, C021 or C022 may be damaged.

3. Indoor/Outdoor Interface Circuit

The interface circuit superimposes an interface signal on the DC 35V line to perform communications between indoor and outdoor units. This circuit consists of a transmitting circuit which superimposes an interface signal transmit from the microcomputer on the DC 35V line and a circuit which detects the interface signal on the DC 35V line.
Communications are performed alternatively transmitting and receiving.

3-1 Communication signal from outdoor microcomputer to indoor microcomputer.

At first outdoor microcomputer will send a request signal (SDO) to indoor microcomputer.
38 KHz of carrier signal is generated and modulated by the request signal (SDO) from the outdoor microcomputer pin ⑪.
This signal is superimposed to DC 35V line via C801 and L801.
To prevent erroneous reception, the outdoor microcomputer is designed so that it cannot receive a signal while it is outputting a request signal.
The receiving circuit in the indoor unit consists of a comparator and transistor. The interface signal from the outdoor unit on the DC 35V line is supplied to C821, where DC components are eliminated, and is then shaped by the comparator. The shaped signal is detected by diode, amplified by amp, and output to pin ㊾ of the indoor microcomputer.
Fig. 3-2 shows the waveforms at each component when data is transferred from the outdoor microcomputer to the indoor microcomputer.

3-2 Communication signal from indoor microcomputer to outdoor microcomputer.

The request signal (SDO) generates by indoor microcomputer is output to pin ㊿, and amplifies by Q801.
I/F signal approx. 38 kHz is generated by comparator, then modulated by the signal from pin ㊿ of indoor microprocessor.
This modulated I/F signal is then amplified and superimposed to DC 35V line via L801 and C802 of indoor interface circuit.
Fig. 3-3 shows the waveforms at each component when data is transferred from outdoor microcomputer to indoor microcomputer.
The circuit operation of the outdoor receiving circuit is same as indoor receiving circuit.

Fig. 3-1 shows the interface circuit used for the indoor and outdoor microcomputers to communicate with each other.

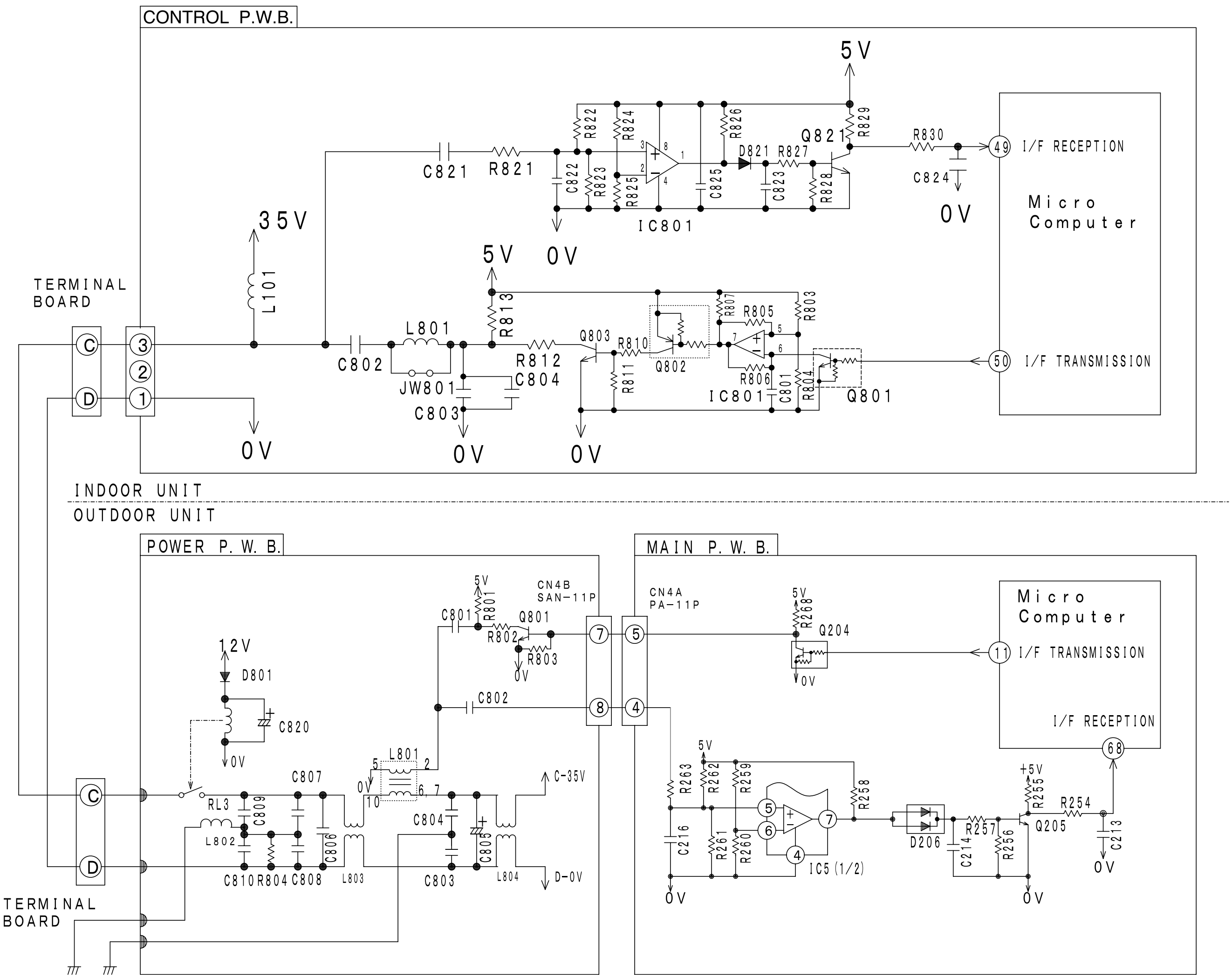


Fig. 3-1

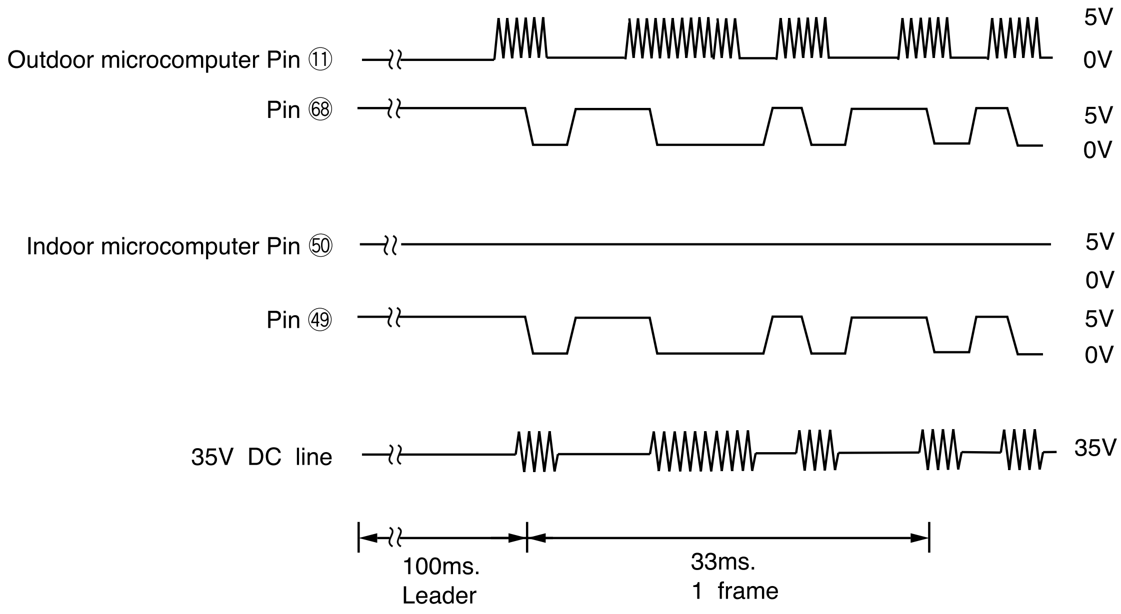


Fig. 3-2 Voltages Waveforms of Indoor / Outdoor Microcomputers (Outdoor to Indoor Communications)

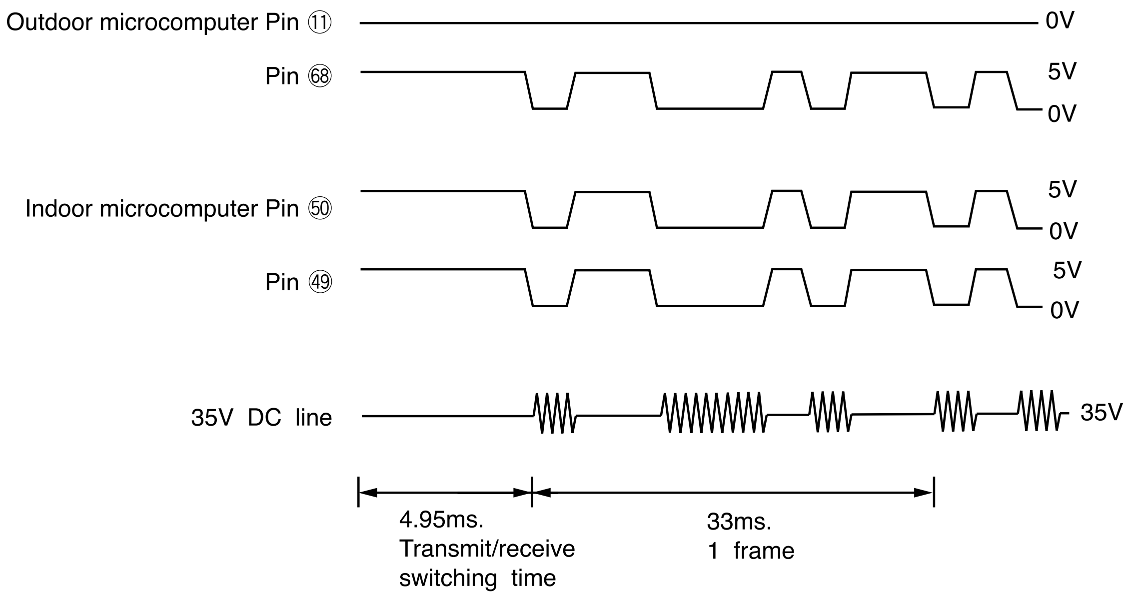


Fig. 3-3 Voltages Waveforms of Indoor / Outdoor Microcomputers (Indoor to Outdoor Communications)

[Serial Communications Format during Normal Communications]

(1)Outdoor microcomputer (HIC) to indoor microcomputer

(2)Indoor microcomputer to outdoor microcomputer (HIC)

(3)Communications waveforms

[Example] When the outdoor message is all 0s and indoor message is all 1s:

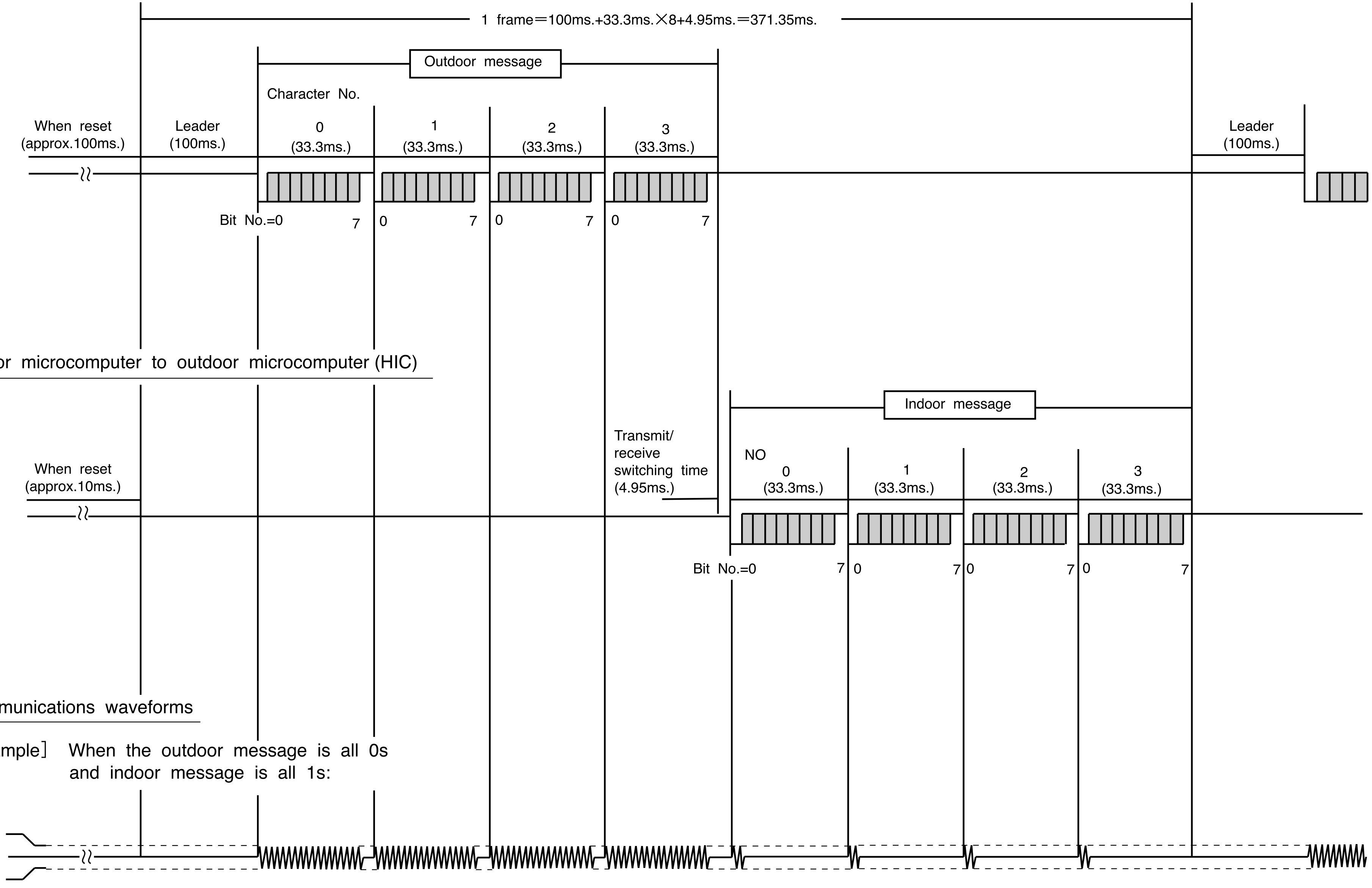


Fig. 3-4

[Serial Communications Data]

(1)Outdoor message

Character No.	Bit No.	Contents	Data
0	0	Multi-bit	1/0
0	1		0
0	2	During forced operation	1/0
0	3	Defrost request signal	1/0
0	4	Self-diagnosis(0 LSB)	1/0
0	5	Self-diagnosis(1)	1/0
0	6	Self-diagnosis(2)	1/0
0	7	Self-diagnosis(3 MSB)	1/0
1	0	Outside temperature(0 LSB)	1/0
1	1	Outside temperature(1)	1/0
1	2	Outside temperature(2)	1/0
1	3	Outside temperature(3)	1/0
1	4	Outside temperature(4)	1/0
1	5	Outside temperature(5)	1/0
1	6	Outside temperature(6)	1/0
1	7	Outside temperature(7 MSB)	1/0
2	0	Compressor during operation	1/0
2	1	Compressor during operation	1/0
2	2	Actual compressor rotation speed(0 LSB)	1/0
2	3	Actual compressor rotation speed(1)	1/0
2	4	Actual compressor rotation speed(2)	1/0
2	5	Actual compressor rotation speed(3)	1/0
2	6	Actual compressor rotation speed(4)	1/0
2	7	Actual compressor rotation speed(5 MSB)	1/0
3	0		0
3	1	Fan-7-step request	1
3	2		0
3	3		0
3	4		0
3	5		0
3	6		0
3	7		0

(2)Indoor message

Character No.	Bit No.	Contents	Data
0	0	Operation mode(0 LSB)	1/0
0	1	Operation mode(1)	1/0
0	2	Operation mode(2 MSB)	1/0
0	3	Indoor in-operation bit	1/0
0	4	Capacity code(0 LSB)	0
0	5	Capacity code(1)	0
0	6	Capacity code(2)	0
0	7	Capacity code(3 MSB)	0
1	0	Fan(0 LSB)	1/0
1	1	Fan(1)	1/0
1	2	Fan(2 MSB)	1/0
1	3	2-way valve	0
1	4	Reversing valve	1/0
1	5		0
1	6		0
1	7	Compressor ON	1/0
2	0	Compressor command speed(0 LSB)	1/0
2	1	Compressor command speed(1)	1/0
2	2	Compressor command speed(2)	1/0
2	3	Compressor command speed(3)	1/0
2	4	Compressor command speed(4)	1/0
2	5	Compressor command speed(5)	1/0
2	6	Compressor command speed(6)	1/0
2	7	Compressor command speed(7 MSB)	1/0
3	0	15/20(A)	1/0
3	1	OVL up	1/0
3	2		1/0
3	3	Compressor minimum rotation speed(0 LSB)	1/0
3	4	Compressor minimum rotation speed(1)	1/0
3	5	Compressor minimum rotation speed(2)	1/0
3	6	Compressor minimum rotation speed(3)	1/0
3	7	Compressor minimum rotation speed(4 MSB)	1/0

4. IPM (Intelligent Power Module)

- Fig.4-1 shows the intelligent power module and its peripheral circuit.
  The three transistors on the positiveⒺside are called the upper arm, and the three transistors on the negativeⒹside, the lower arm.

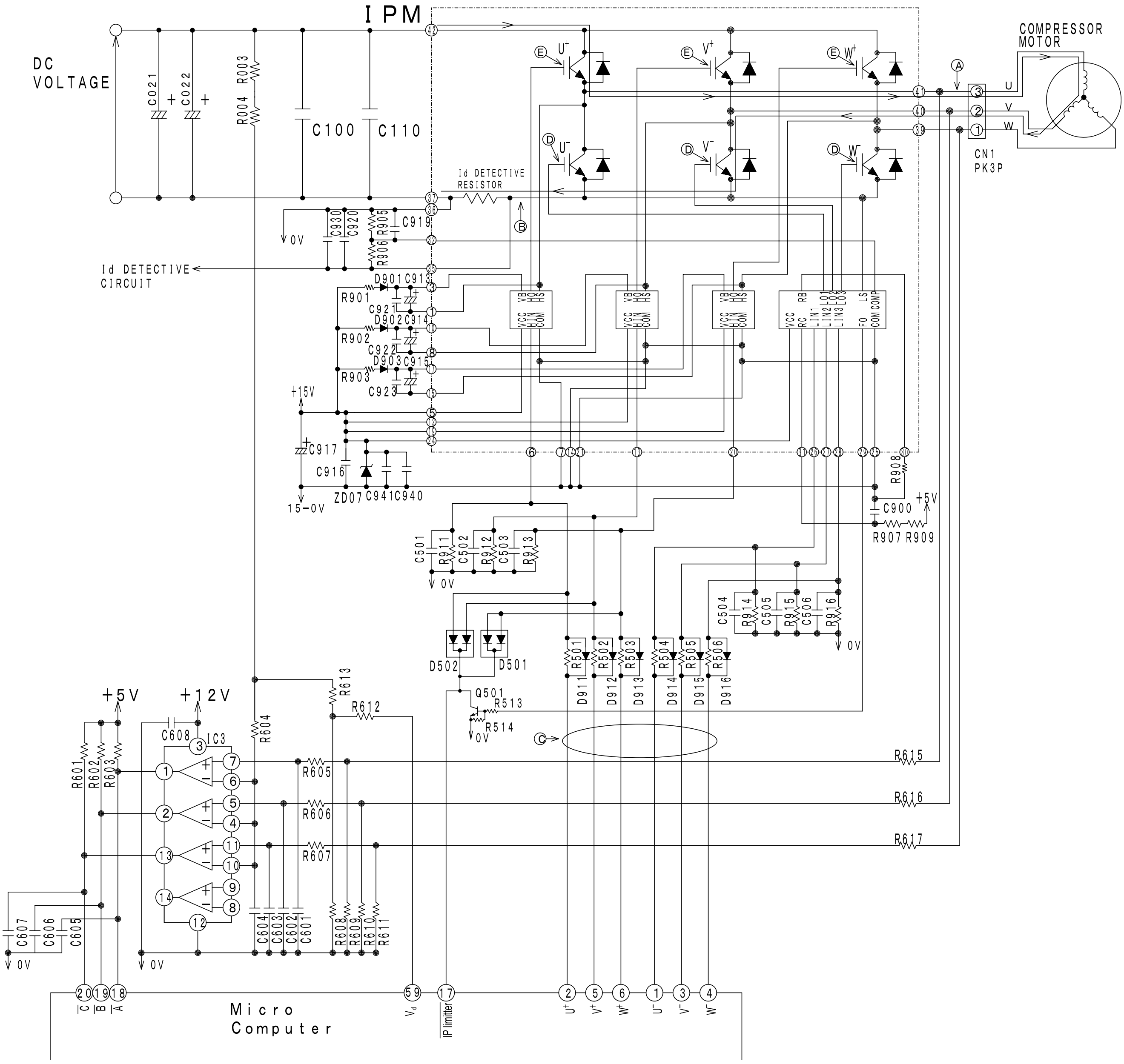


Fig. 4-1 Intelligent power module circuit (U^+ is ON, V^- is ON)

Intelligent power module switches power supply current according to position of the compressor motor rotor.
The switching order is as shown in Fig. 4-2.

At point Ⓔ: U^+ is ON, V^- is ON (circuit in Fig.4-1)
At point Ⓕ: U^+ is chopped (OFF), V^- is ON (circuit in Fig.4-4)

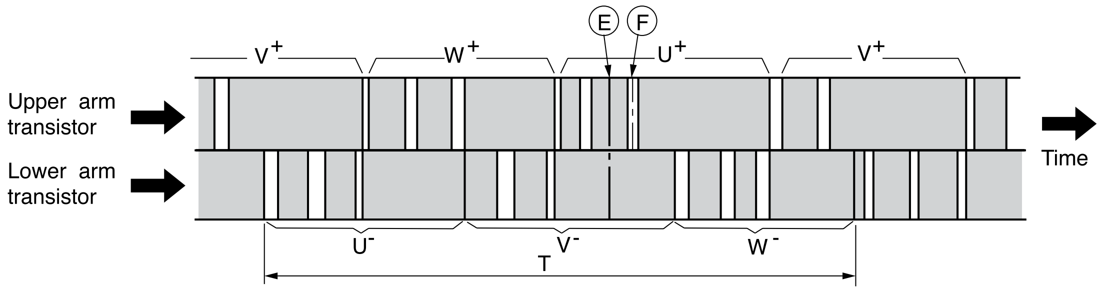


Fig. 4-2 Switching order of power module

Upper arm transistor is controlled to ON/OFF by 4.8kHz chopper signal. Rotation speed of the compressor is proportional to duty ratio (ON time/ ON time + OFF time) of this chopper signal.
Time T in Fig. 4-2 shows the switching period, and relation with rotation speed (N) of the compressor is shown by formula below;

$$N = 60/2 \times 1/T$$

Fig. 4-3 shows voltage waveform at each point shown in Figs. 4-1 and 4-4. First half of upper arm is chopper, second half is ON, and first half of lower arm is chopper, second half is ON.

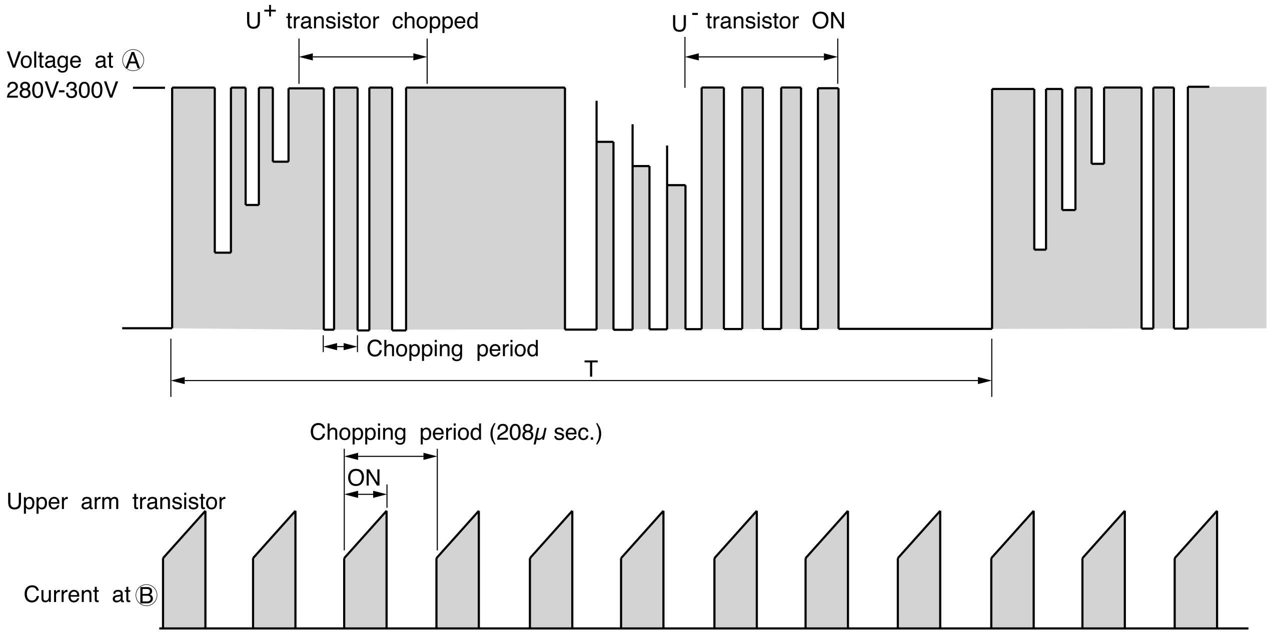


Fig. 4-3 Voltage waveform at each point

When power is supplied $U^+ \rightarrow V^-$, because of that U^+ is chopped, current flows as shown below;

(1) When U^+ transistor is ON: U^+ transistor → U coil → V coil → V^- transistor → DC current detection resistor → Point Ⓑ (Fig. 4-1)

(2) When U^+ transistor is OFF: (by inductance of motor coil) U coil → V coil → V^- transistor → U^- diode → Point Ⓐ (Fig. 4-4)

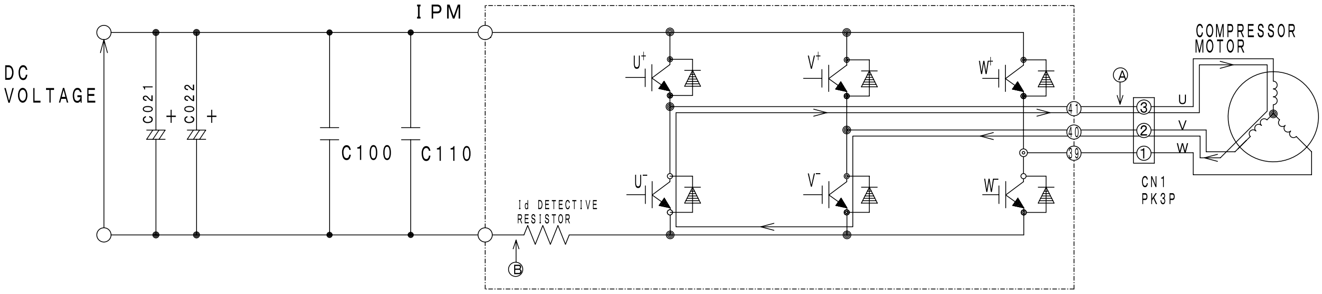


Fig. 4-4 Power module circuit (U^+ is OFF, V^- is ON)

Since current flows at point Ⓑ only when U^+ transistor and V^- transistor is ON, the current waveform at point Ⓑ becomes intermittent waveform as shown in Fig.4-3. Since current at point Ⓑ is approximately proportional to the input current of the air conditioner, input current is controlled by using DC current (Id) detection resistor.

<Reference>
If power module is defected, self diagnosis lamps on the MAIN P.W.B. may indicate as shown below:

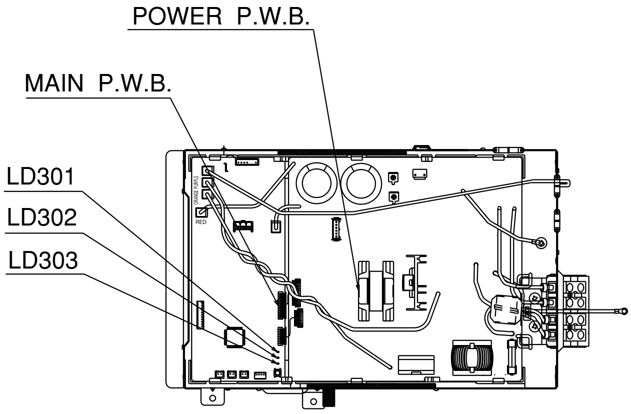


Fig. 4-5

Table 4-1

Self-diagnosis	Self-diagnosis lamp and mode	
Ip (peak current cut)	LD301	Blinks 2 times
Abnormal low speed rotation	LD301	Blinks 3 times
Switching incomplete	LD301	Blinks 4 times

- IPM drive circuit
  The inverter driving device (IGBT) and the drive circuit are built in the IPM. The IPM receives the signal from the microcomputer and convert it to 0 – 15 V signal to drive the IGBT.
  When the unit operates at low speed, a chopper signal is emitted from the micro computer as shown in Fig. 4-6. (0 to 5 V)
  The signal is converted to 0 – 15 V at inside the IPM and transmitted to the gate of the transistor (IGBT) in each phase to drive the IGBT.
  When abnormal peak current was detected while the inverter is driving, the IPM outputs the Fail signal immediately from the pin ㉙ and forces the lower arm transistor to shut off at the same time. In this step, the Q501 is turned on and the input signal of the upper arm is also shut off through the D501 and D502, so that all signals to the IGBT are shut off. This signal is also distributed to microcomputer (pin ⑰) as a Lo signal to stop the drive signal and blink the self diagnosis lamp as two time.
  When the peak current is detected, the IPM keeps the lower arm off for about 4ms and the drive signal into stand-by state. 3 minutes after this state, the micro computer outputs the drive signal and restarts the operation.

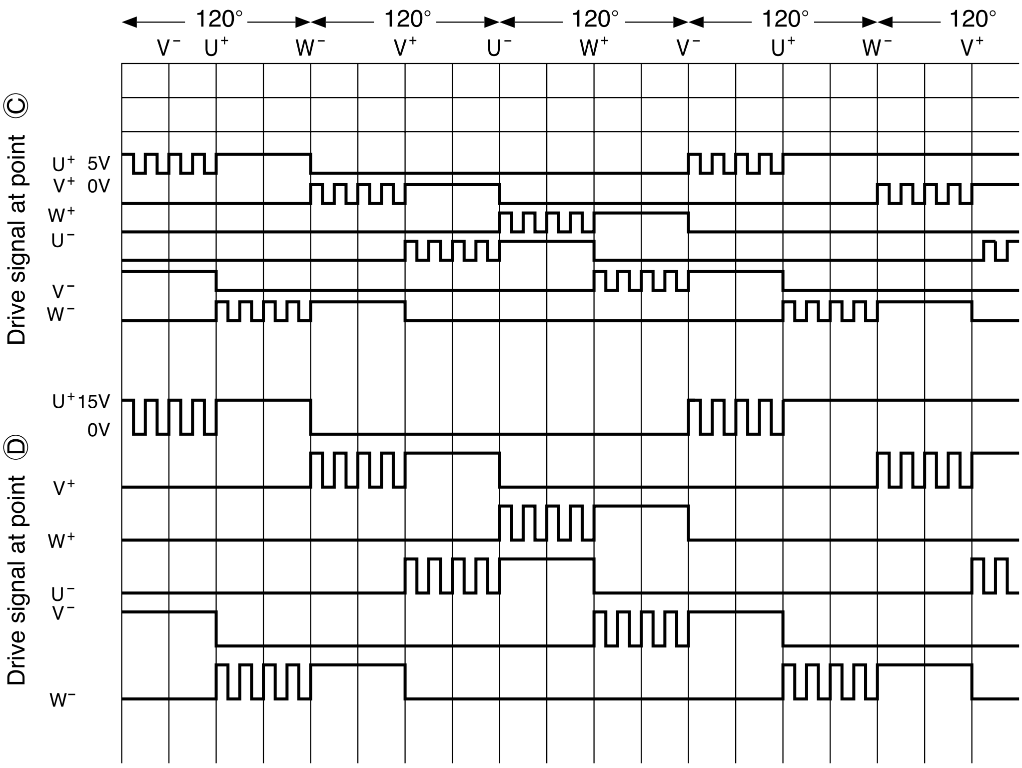


Fig. 4-6

5. Power Circuit for P.W.B.

- Fig. 5-1 shows the power circuit for P.W.B.

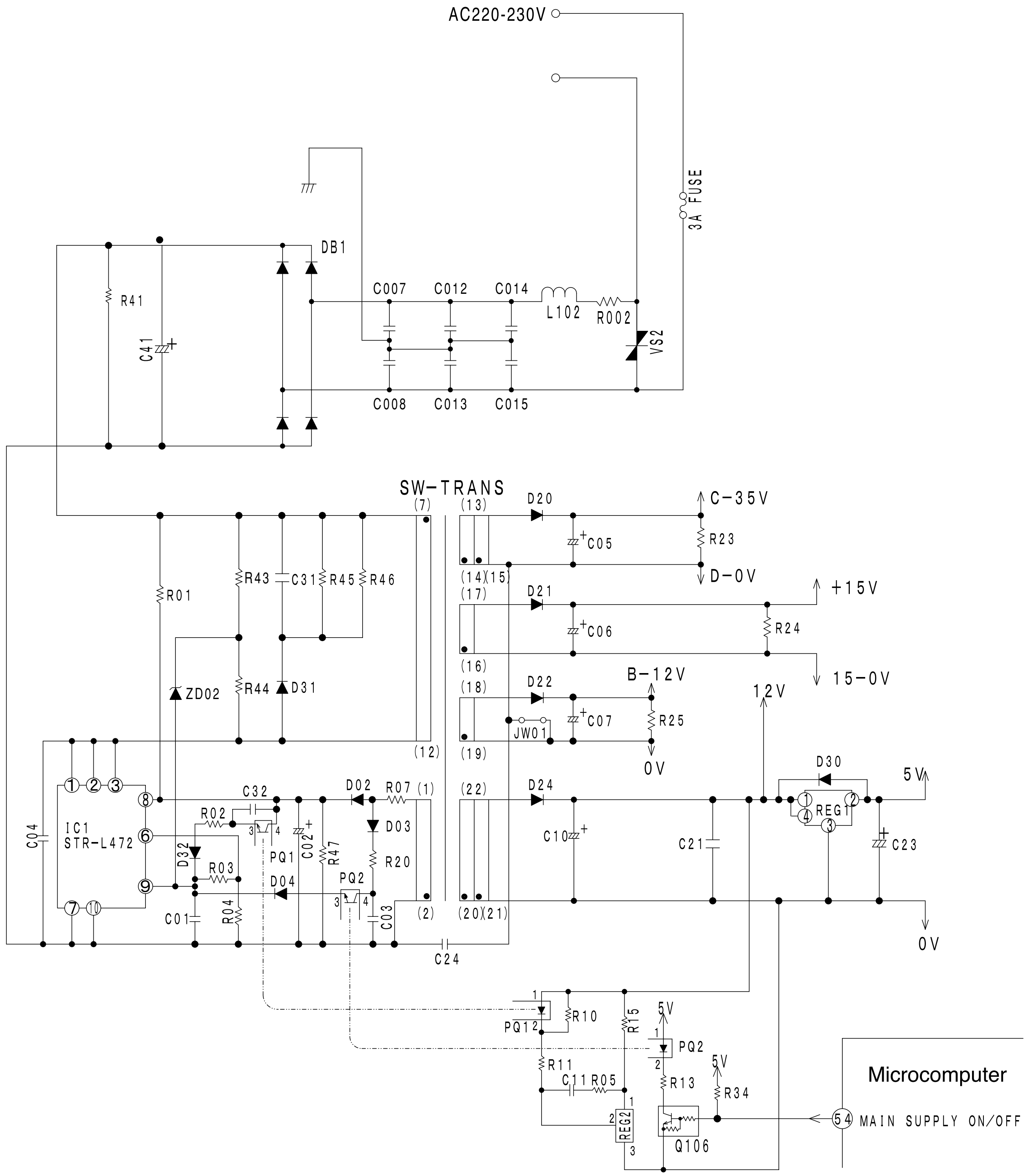


Fig. 5-1

- In the power circuit for P.W.B., power supply for microcomputer, peripheral circuits, and IPM driver circuit and, as well as DC 35V, are produced by switching power circuit.
- Switching power circuit performs voltage conversion effectively by switching transistor IC1 to convert DC 330V voltage to high frequency of about 20kHz to 200kHz.

- The voltage specification of the power circuit is as follows.

<Check points>

Output	Voltage spec.	Main load	Measuring points +	Measuring points −	Potential failure modes
12V	11-13V	MAIN P.W.B. (CN3, CN4)	R701 (“12V” display) C21 (“12V” display)	R006 (“0V” display) J27, J30	The unit won’t operate MAIN P.W.B. error
5V	4.5-6V	MAIN P.W.B. (CN3, CN4)	D30 anode (“5V” display) J25	R006 (“0V” display) J27, J30	The unit won’t operate MAIN P.W.B. error
B-12V	11-16V	Expansion valve	R25 (“B-12V” display)	R25 (“B-0V” display)	LD301 blinks 5 times; Expansion valve error
15V	14-17V	DC fan motor (CN24) MAIN P.W.B. (CN3, CN4)	C06+ side	C06- side	LD301 blinks 3 times, or 4 times, or 12 times.
35V	33.5-38V	Indoor unit electrical parts (Terminal C,D) Reversing valve (CN2)	D20 cathode (“C-35V” display) Terminal C (blown line)	J5, J17 Terminal D (red line)	Indoor unit won’t operate. Indoor / Outdoor miss conection.

- Check each voltage. If each voltage meets the voltage specification above, the power circuit is normal.
- If any error is found after checking, remove all loads and recheck each voltage.
  If no error is found in this step, the power circuit is normal. Check the removed loads.
  If any error is found in this step, the power circuit has any failure. Replace the power P.W.B.

※ A short-circuited load may cause an output error not only in the load but also in the others. Be sure to check all outputs of the loads.

※ Be sure to wait 15 minutes or more in order to discharge all the remaining voltage in the circuit to connect/disconnect the wiring, other wise, the components may be damaged.

- The failures of the loads are as follows.

Failed output	Possible causes	Criterion
35V	Reversed connection of the cable. Electrical part for the indoor unit has a failure. Short-circuited reversing valve	Connect the cable correctly. Remove the connection cable and measure the voltage. If the voltage is correct, check the electrical parts for the indoor unit. Remove the CN2 and measure the voltage. If the voltage is correct, check the reversing valve.
15V	DC fan motor error Main P.W.B. error	Remove the CN24 and measure the voltage. (connect the CN3.) If the voltage is correct, check the DC fan motor. Also, check the main P.W.B. 1A fuse for blow out in this step. Remove the CN3 and CN4 and meaure the voltage. If the voltage is correct, check the main P.W.B.
12V, 5V	Main P.W.B. error	Remove the CN3 and CN4 and meaure the voltage. If the voltage is correct, check the main P.W.B.

6. Microcpomputer's Peripheral Circuits

6-1. Overload control circuit (OVL control circuit)

Overload control is to decrease the speed of the compressor and reduce the load when the load on the air conditioner increases to an overload state, in order to protect the compressor, electronic components and power breaker.

Overloads are judged by comparing the DC current level and set value

Fig.6-1 shows the overload control system configuration and Fig. 6-4 is a characteristic diagram on overload judgement values. There are two types of control which has named IS OVL and ID OVL.

IS OVL is limiting the whole input of this room air conditioner system through the current sensor CT1 in order to keep the maximum rating of components by reading total operating current.

ID OVL is watching and limits the compressor current through the detection resistor, which is built in IPM in order to control the compressor reliability. Since the compressor reliability is related with its speed, the ID OVL value is also linked with the compressor speed. Fig.6-2 shows an ID OVL limitation curve.

All of OVL operation values were programmed into EEPROM memory.

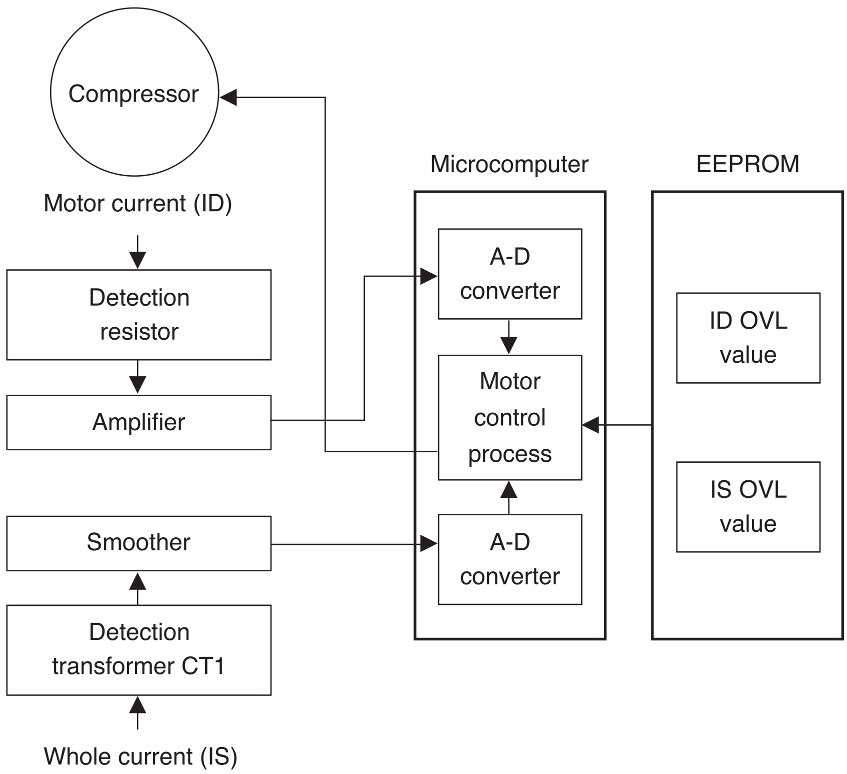


Fig. 6-1 Overload Control System

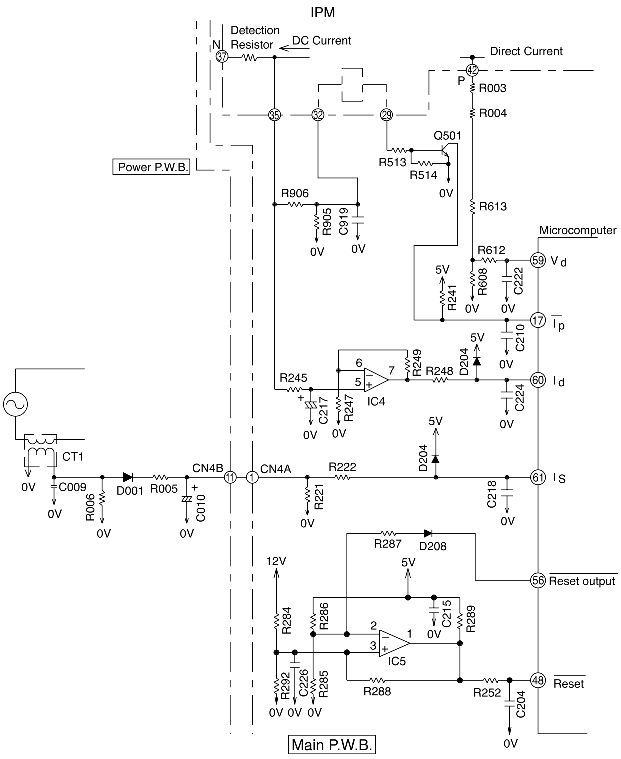


Fig. 6-2

(1) IS OVL

The voltage amp. circuit amplifies the DC current level detected by the detection transformer CT1. Receiving this, the microcomputer converts it to a digital signal and compares it with the internal data to judge whether or not overload control is required.

Fig. 6-3 shows the rotation speed control. When the voltage at pin (61) of the microcomputer exceeds the set value, the microcomputer decreases the rotation speed of the compressor and reduces the load.

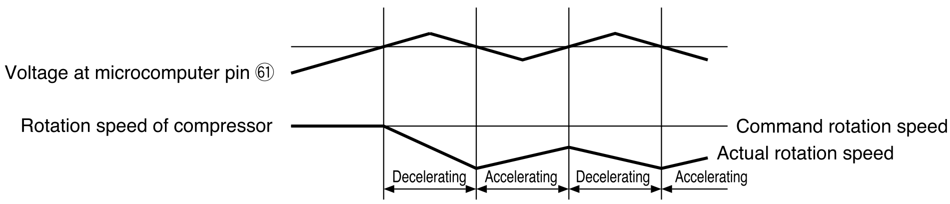


Fig. 6-3

(2) ID OVL

Fig. 6-2. The filter consisting of R245 and C217 removes high harmonic frequencies from the voltage generated by the current flowing to Detection resistor; R245 and C217 average the voltage. This voltage is then input to IC4 pin ⑤ and supplied to microcomputer pin (60). The microcomputer compares this input with the set value, and if the input exceeds the set value, it enters overload control status.

The set Value is determined by the amplification of the voltage amp. circuit

{ Amplification : high → DC current : low
{ Amplification : low → DC current: high

Fig. 6-4 shows the rotation speed control. When the voltage at pin (60) of the microcomputer exceeds the set value, the microcomputer decreases the rotation speed of the compressor and reduces the load.

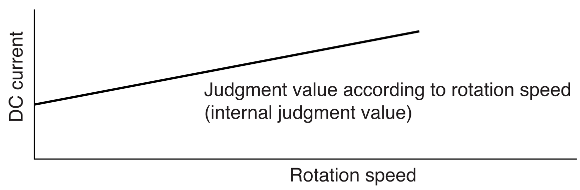


Fig. 6-4

R003,R004,R608,R613, detect the DC voltage at the power circuit. The microcomputer receives a DC voltage and applies correction to the overload set value so the DC current will be low when the DC voltage is high.
(Since the load level is indicated by the DC voltage multiplied by DC current, R247, R248 and R249 are provided to perform the same overload judgement even when the voltage varies.)

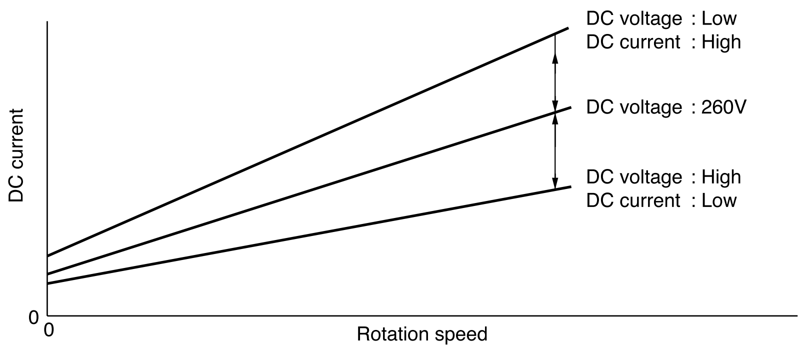


Fig. 6-5

(3) Start current control

It is required to maintain the start current (DC current) constant to smooth the start of the DC motor of the compressor.
RAC-25JX5 and RAC-35JX5 use software to control the start current.
The start current varies when supply voltage varies. This control method copes with variations in the voltages as follows.

(1) Turns on the power module's U^+ and V^- transistors so the current flows to the motor windings as shown in Fig. 6-6.
(2) Varies the turn-ON time of the U^+ transistor according to the DC voltage level and the start is controlled so the start current is approx. 10A .

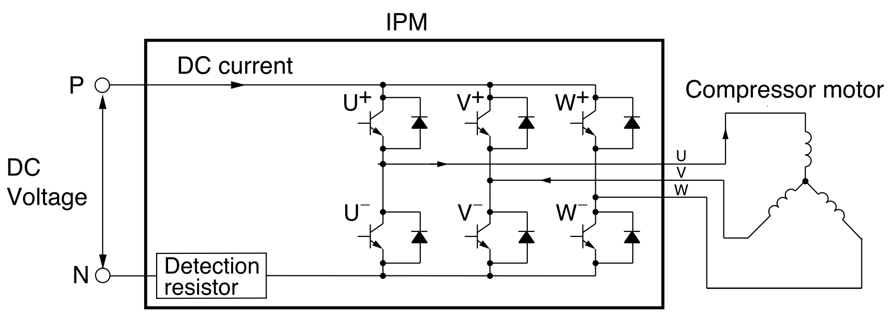


Fig. 6-6

6-2. Reset Circuit

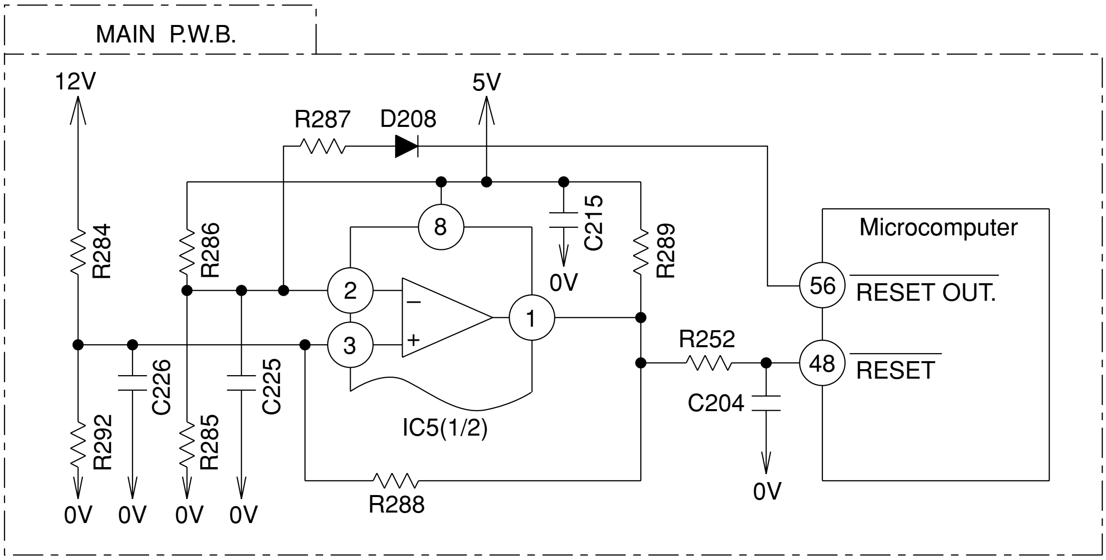


Fig. 6-7

The reset circuit initializes the microcomputer program when Power is “ON” from “OFF”.
Low voltage at pin ㊽ resets the microcomputer , and HI activates the microcomputer.
Fig. 6-7 shows the reset circuit and Fig. 6-8 shows waveform at each point when power is turned on and off.
When power is turned on, 12V line and 5V line voltages rise and 12V line voltage reaches 10.9V an reset voltage input to pin ㊽ of microcomputer is set to Hi .
Reset voltage will be hold “Hi” until the 12V line voltage drops to 9.90V even though the power shuts down.

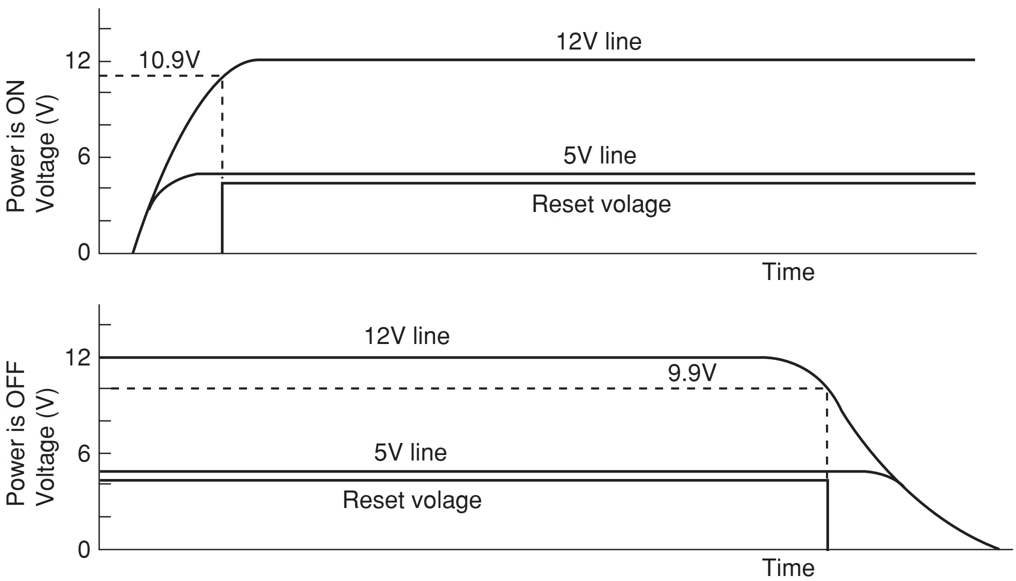


Fig. 6-8

7. Temperature Detection Circuit

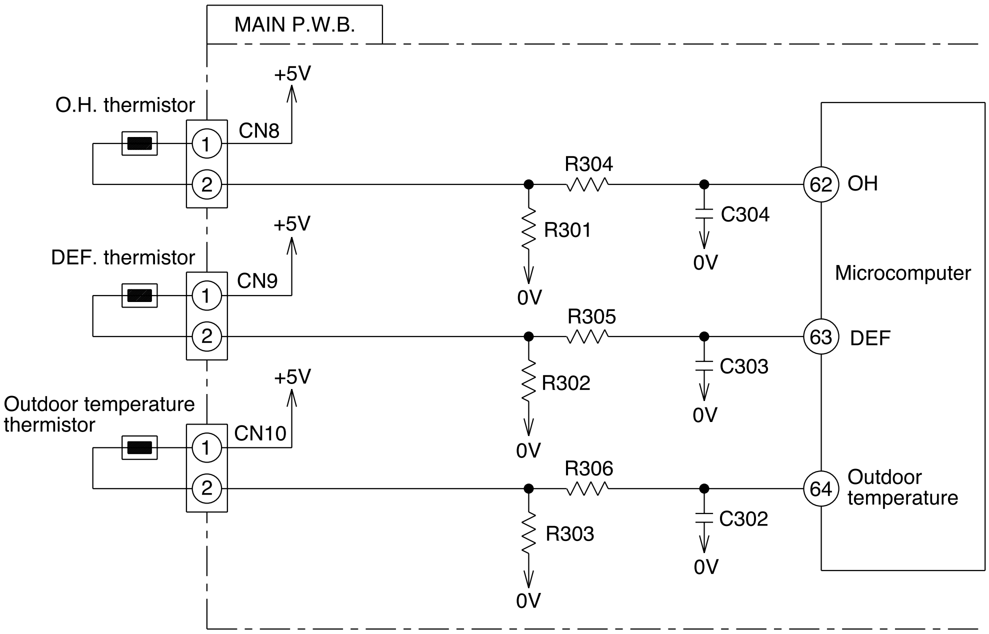


Fig. 7-1

The Over heat thermistor circuit detects the temperature at the surface of the compressor head, the Defrost. thermistor circuit detects the defrosting operation temperature.
A thermistor is a negative resistor element which has the characteristics that the higher (lower) the temperature, the lower (higher) the resistance.
When the compressor is heated, the resistance of the Over heat thermistor becomes low and voltage to a pin ⑥② of microcomputer is increased.
Microcomputer compares the voltage at pin ⑥② with the internal set value, if it is exceeded the set value microcomputer judges that the compressor is overheated and stops operation.
When frost forms on the outdoor heat exchanger, the temperature at the exchanger drops abruptly. Therefore the resistance of the Defrost. thermistor becomes high and the voltage at pin ⑥③ of microcomputer drops. If this voltage becomes lower than the set value stored inside, the microcomputer starts defrosting control. During defrosting operation the microcomputer transfers the defrosting condition command to the indoor microcomputer via the circuit interface.
The microcomputer always reads the outdoor temperature via a thermistor (microcomputer pin ⑥④), an transfers it to the indoor unit, thus controlling the compressor rotation speed according to the value set at the EEPROM in the indoor unit, and switching the operation status (outdoor fan on/off, etc.) in the dehumidifying mode.
The following shows the typical values of outdoor temperature in relation to the voltage:

Table 7-1

Outdoor temperature (℃)	−10	0	10	20	30	40
R303 Voltage (V)	1.19	1.69	2.23	2.75	3.22	3.62

<Reference>
When the thermistor is open, in open status, or is disconnected, microcomputer pins ⑥② − ⑥④ are approx. 0V; when the thermistor is shorted, they are approx. 5 V, and LD301 blinks seven times. However, an error is detected only when the OH thermistor is shorted; in such a case, the blinking mode is entered 12 minutes after the compressor starts operation.

8. Reversing valve control circuit

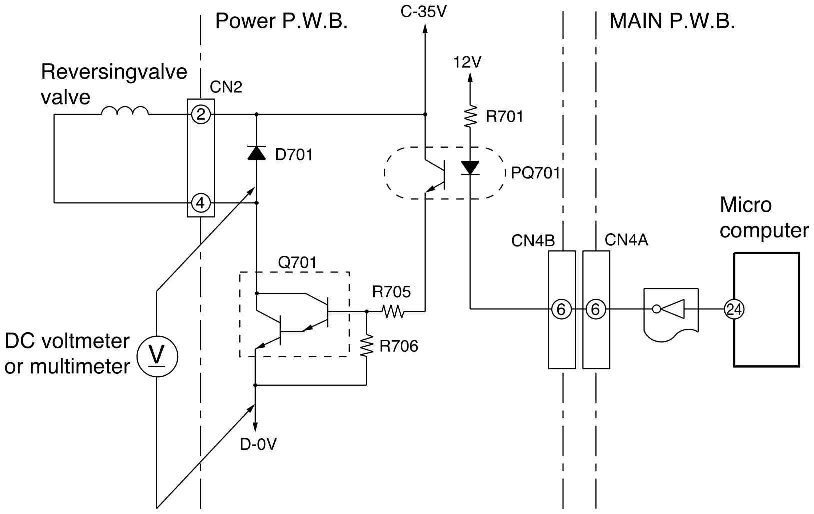


Fig. 8-1

Reversing valve control circuit will switch reversing valve ON/OFF according to instruction from indoor microcomputer depending on the operation condition shows in Table 8-1.
Voltage at Q701 (between Collector and Emittor) in each operation condition is approximately as shown in Table 8-1 when measured by multimeter.

Table 8-1

Operation condition		Collector voltage of Q701
Cooling	General operation of cooling	About 0.8V
Heating	In normal heating operation	About 35V
	MAX. rotation speed instructed by indoor microcomputer after defrost is completed	About 35V
	Defrosting	About 0.8V
Dehumidifying	Sensor dry	About 0.8V

9. Electric expansion valve control circuit

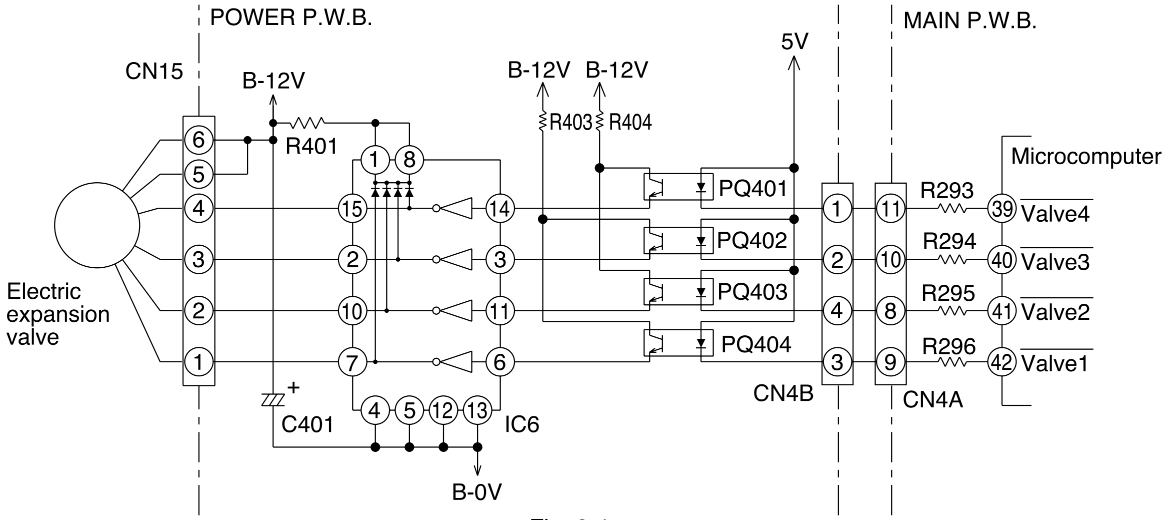


Fig. 9-1

- To drive the expansion valve, use the B-12 V output. Use a 4-phase coil and feed power to the phases 1 and 2, then switch over the filed poles to control the opening of the valve.
- The reference between conducting phase switch over direction and the open/close direction are shown in Table 9-1. When the power is turned on, approx. 0.9 V is applied to the CN15 and the pins (① to ④) and when no power is supplied, 12 V is applied. When the power is reset, the expansion valve starts initial operation for 5 to 10 seconds.
- During the initial operation, measure each pin of the CN15 (① to ④) with a multimeter. If no change is found around 0.9 V or 12V in this step, the expansion valve or the micro computer has failure.
- The logic waveform during the operating of the expansion valve is shown in Fig. 9-2.

Table 9-1

CN15 Pin No.	Lead wire	Drive status							
		1	2	3	4	5	6	7	8
④	White	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
③	Yellow	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
②	Orange	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
①	Blue	OFF	OFF	OFF	OFF	OFF	ON	ON	ON

Operation mode
1→2→3→4→5→6→7→8 VALVE CLOSE
8→7→6→5→4→3→2→1 VALVE OPEN

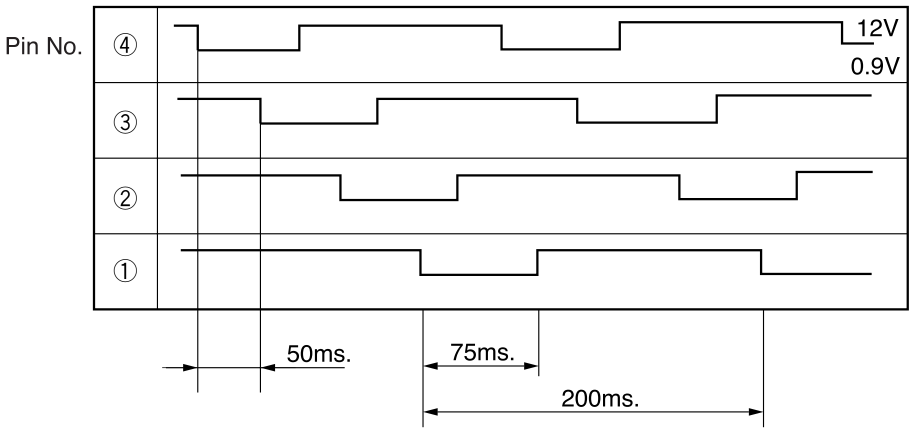
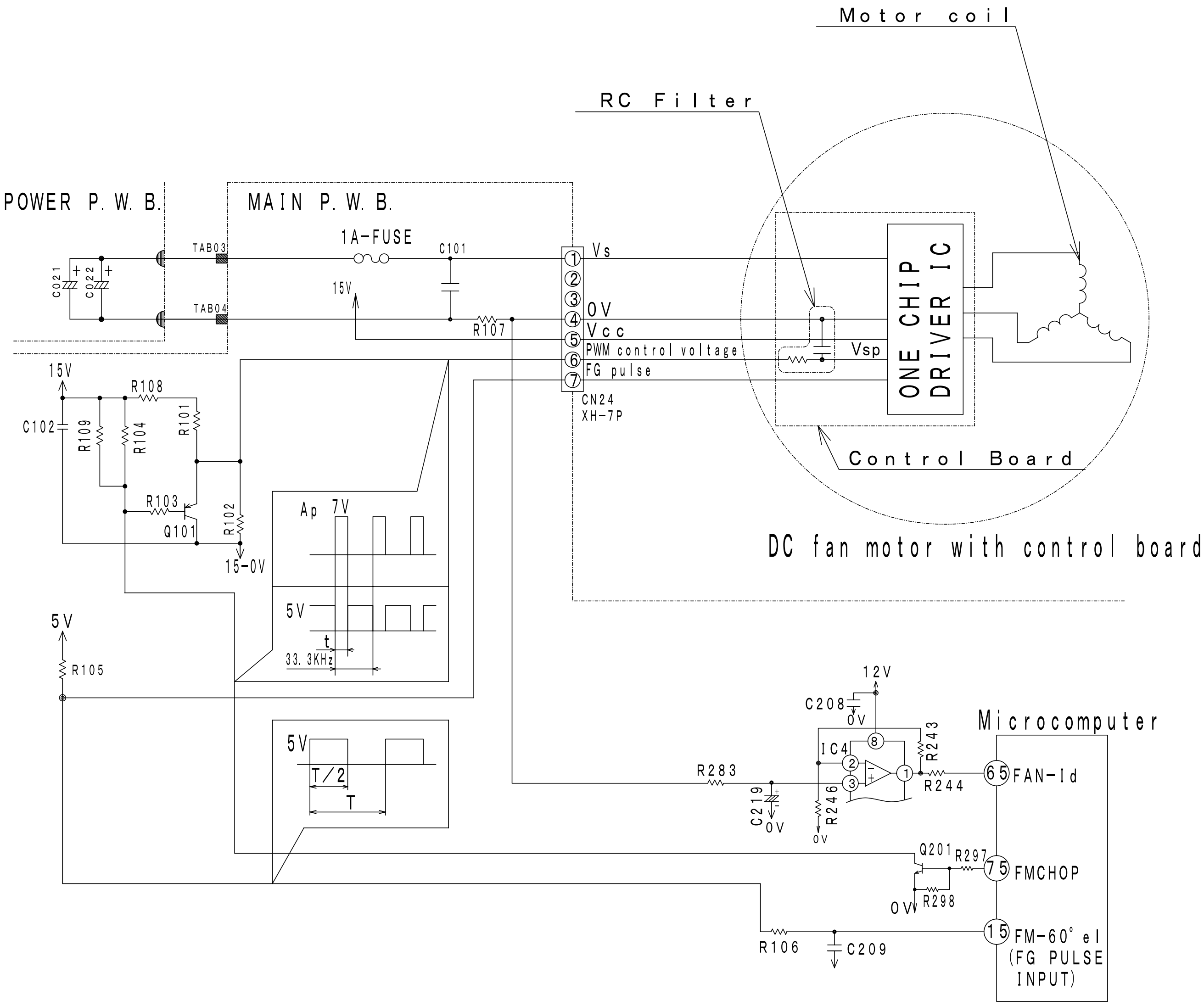


Fig. 9-2

10. Outdoor DC Fan Motor control circuit



This model uses DC Fan Motor which has a controller circuit built in the Motor.
This DC Fan Motor will rotate by control voltage apply to Vsp input. (Voltage range: 1.7 to 7V DC)

- Vsp high : Faster ;
- Vsp low : slower ;
- Vsp lower than 1.7V : stop

Motor will output FG pulse by following this motor revolution.
Outdoor microcomputer will output PWM control signal from ⑦⑤ by following the instruction from indoor microcomputer.
This PWM control signal will convert to Vsp voltage by smoothing circuit (R242 & C209)
Fan motor will start to rotate when Vsp was proceeding over than 1.7V, and generate FG pulse by rotation speed.
FG pulse will feed back to Outdoor microcomputer ⑮.
DC Fan Motor circuit has to match the Fan Motor revolution with instructed revolution. Such as...

- FG feedback: Faster Instruction: Slower ... Decrease pulse width
- FG feedback: Slower Instruction: Faster ... Increase pulse width

FG pulse is also used for Fan Motor failure detection.
Microcomputer will monitor FG pulse 30 seconds after start the fan motor. If there is no signal detected, it will consider that the Fan Motor was malfunction and stop the operation. In this case, LD302 on control P.W.B. will blink 12 times. (Fan Motor lock detected)
R107 and IC4 are used for Fan Motor over current.

< Reference >
When operation stop with LD301 blinks 12 times, it may be caused by faulty DC fan motor.
In this case, please check CN6 and CN12 connection first. It makes Fan Motor Lock also if those connectors are in misconnection.
DC Fan Motor has broken invites 1A Fuse burned. Please replace both DC Fan Motor and 1A Fuse together.
It will makes “Fan Lock Stop” when something has disturb the Fan rotation by inserting materials into propeller fan or ice has growing inside of outdoor unit by snowing.
It may make “Fan Lock Stop” by strong wind (ex.17m/sec. or above) against the Fan rotation. In this case unit will be restart again after a while.
In case of “ Fan Lock Stop” even though the DC Fan Motor is rotating correctly, the possible cause in Fan Motor problem or control board problem. Stop after the Fan motor runs 2 minutes, Fan Motor may be broken.
< Caution >
Please take care for the electrical shock by high voltage of DC Fan Motor power source which is common with compressor when you are servicing this unit.
You can not confirm the coil and wiring of Motor directly due to the built in control circuit in Fan Motor.

SERVICE CALL Q & A

MODEL RAS-25JX5 / RAC-25JX5
RAS-35JX5 / RAC-35JX5

COOLING MODE

Q1 The compressor has stopped suddenly during cooling operation.

A1 Check if the indoor heat exchanger is frosted. Wait for 3-4 minutes until it is defrosted.

If the air conditioner operates in cooling mode when it is cold, the evaporator may get frosted.

DEHUMIDIFYING MODE

Q2 Fan speed is not switched over during dehumidifying operation.

A2 Fans speed is normally set to LOW during dehumidifying operation.

Q3 Cool air comes from the unit during dehumidifying operation.

A3 To have an operation with high dehumidifying effect, the unit operates at low fan speed. As a result, cool air comes from the unit. This phenomenon is not a fault.

HEATING MODE

Q4 The circulation stops occasionally during Heating mode.

A4 It occurs during defrosting. Wait for 5-10 minutes until the condenser is defrosted.

Q5 When the fan speed is set at HIGH or MED, the flow is actually Weak.

A5 At the beginning of heating, the fan speed remains LOW for 30 seconds. If HIGH is selected, it switches to LOW and again to MED after additional 30 seconds.

Q6 Heating operation stops while the temperature is preset at "30".

A6 If temperature is high in the outdoor, heating operation may stop to protect internal devices.

Q7 When “Auto fan” mode is set, the indoor fan speed changes from HIGH through MED to LOW.

A7 This is not an error. The anti cool air function shows this phenomenon.

In the fan “Auto” mode, the unit detects the heat exchange temperature. When the temperature becomes low, the fan speed changes from HIGH, through MED to LOW.

AUTO FRESH DEFROSTING

Q8 After the ON/OFF button is pressed to stop heating, the outdoor unit is still working with the OPERATION lamp lighting.

A8 Auto Fresh Defrosting is carried out : the system checks the outdoor heat exchanger and defrosts it as necessary before stopping operation.

AUTO OPERATION

Q9 Fan speed does not change when fan speed selector is changed during auto operation.

A9 At this point fan speed is automatic.

NICE TEMPERATURE RESERVATION

Q10 When on-timer has been programmed, operation starts before the preset time has been reached.

A10 This is because Nice temperature reservation function is operating. This function starts operation earlier so the preset temperature is reached at the preset time. Operation may start maximum 60 minutes before the preset time.

Q11 Does Nice temperature reservation function operate during dehumidifying?

A11 It does not work. It works only during cooling and heating.

Q12 Even if the same time is preset, the operation start time varies.

A12 This is because Nice temperature reservation function is operating. The start time varies according to the load of room. Since load varies greatly during heating, the operation start time is corrected, so it will vary each day.

INFRARED REMOTE CONTROL

Q13 Timer cannot be set.

A13 Has the clock been set? Timer cannot be set unless the clock has been set.

Q14 The current time display disappears soon.

A14 The current time disappears in approx. 10 seconds. The time set display has priority.

When the current time is set the display flashes for approx 3 minutes.

Q15 The timer has been programmed, but the preset time disappears.

A15 Is the current time past the preset time? When the preset time reaches the current time, it disappears.

Q16 When the “Sleep” timer is set during operation,
(1) The indoor fan won’t rotate.
(No air comes from the unit)
(2) The air speed won’t change.

⇨ **A16** (1) The temperature arrives at the preset indoor temperature and the air conditioner unit is temporarily stopped. Within about 3 minutes, the fan starts rotation.
(2) When the unit operates at “LOW” air speed, it continues to operate at the same speed.

Q17 The preset temperature is not indicated on the remote control.

⇨ **A17** When automatic operation is performed, the preset temperature won’t be indicated.
However, you can adjust the temperature within a range of ±3°C by pressing the “Room Temperature” button.
If the temperature is 1°C higher than the auto preset temperature, ▲ 1°C will appear.
If the temperature is 1°C lower than the auto preset temperature, ▼ 1°C will appear.

OTHERS

Q18 The indoor fan varies among high air flow, low air flow and breeze in the auto fan speed mode. (Heating operation)

⇨ **A18** This is because the cool wind prevention function is operating, and does not indicate a fault.

The heat exchanger temperature is sensed in the auto speed mode. When the temperature is low, the fan speed varies among high air flow, low air flow and breeze.

Q19 Loud noise from the outdoor unit is heard when operation is started.

⇨ **A19** When operation is started, the compressor rotation speed goes to maximum to increase the heating or cooling capability, so noise becomes slightly louder. This does not indicate a fault.

Q20 Noise from the outdoor unit occasionally changes.

⇨ **A20** The compressor rotation speed changes according to the difference between the thermostat set temperature and room temperature. This does not indicate a fault.

Q21 There is a difference between the set temperature and room temperature.

⇨ **A21** There may be a difference between the set temperature and room temperature because of construction of room, air current, etc. Set the temperature at a comfortable for the space.

Q22 Air does not flow immediately after operation is started.

⇨ **A22** Preliminary operation is performed for one minute when the power switch on and heating or dehumidifying is set. The operation lamp blinks during this time for heating. This does not indicate a fault.

TWO WAY AIR EXCHANGE MODE

Q1 Up to what length the two way air exchange hose can be extended?

A1
- There is a restriction to the length of the two way air exchange hose (maximum length is 3m).

Q2 Is there any limit to the number of bending of the two way air exchange hose?

A2
- If the hose length is 3m or shorter, the hose can be bent (at 90 degrees) up to 4 times.

Q3 What should I do if I do not want fresh air in operation or fresh air in & exhaust operation?

A3
- Two Way Air Exchange Selection Swtich
  ① Prohibit Two Way Air Exchange
  ② Only Exhaust
  ③ Operate Two Way Air Exchange
  (Refer to page 20 in Operation Manual.)

Q4 What is the power consumption during two way air exchange operation?

A4
- **Operation at HI level**
  11.5W
- **Operation at MED level**
  8.7W
- **Operation at LOW mode**
  8.5W

Q5 Are there any conditions to prohibit two way air exchange operation?

A5
- **Exhaust Operation**
- When the temperature inside the room is more than about 43°C,the exhaust does not operate to protect the exhaust fan from damage.
- **When the above mentioned operation has stopped, the "Two Way Air Exchange" lamp on the indoor unit indicators blinks (lights for 10 seconds/light off for 1 second).**
- **Fresh Air In Operation**
- When the air temperature outside the room is more than about 30°C or less than about 3°C, the fresh air in does not operate to prevent dew condensation on the two way air exchange fan and hose and to save energy.
- If the difference in temperature between the inside and outside of the room is more than about 7°C, the fresh air in does not operate to prevent dew condensation on the two way air exchange fan and hose, while cooling operation.
- If the difference in temperature between the inside and outside of the room is more than about 22°C, the fresh air in does not operate to prevent dew condensation on the two way air exchange fan and hose, while heating operation.
- **When the above mentioned operation have stopped, the "Two Way Air Exchange" lamp on the indoor unit indicators blinks (lights for 10 seconds/light off for 1 second).**

Q6 Do the filters need to be replaced?

A6
- Replacement is not necessary for Pre-Filter on the main unit and the Fresh Air In Pre-Filter.
  ① Deodorization/Dust Collecting Fresh Air In Filter can be repeatedly used by washing it with water. However, this filter needs to be replaced approximately once every 3 years.

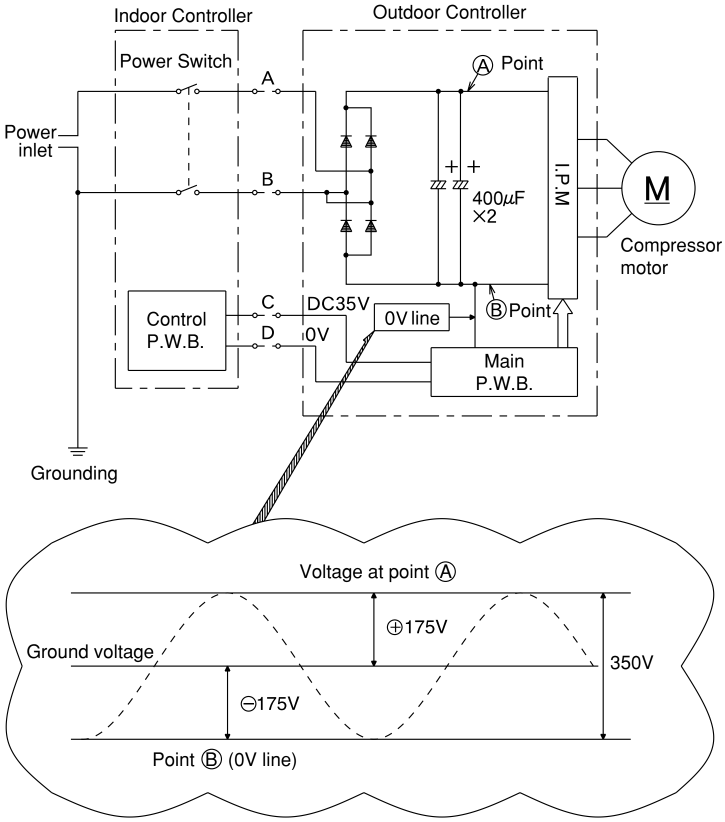
TROUBLE SHOOTING

RAC-25JX5, RAC-35JX5

PRECAUTIONS FOR CHECKING

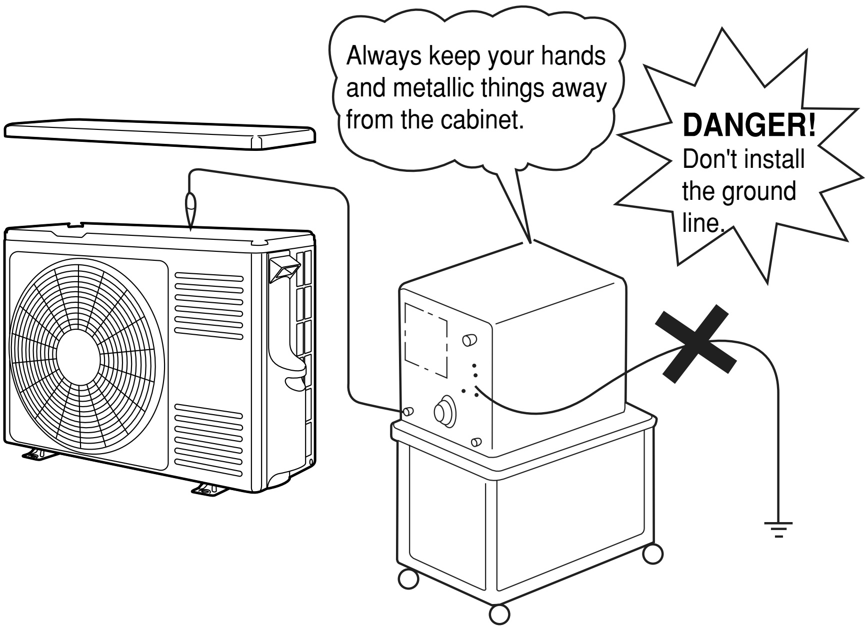
⚠ WARNING

Remember that voltage of 175 V is applied to the 0V line on the P.W.B. or the like as shown in the right diagram.



⚠ WARNING

When using an oscilloscope, never ground it.
Don't forget that high voltage as noted in the figure above may apply to the oscilloscope.



DISCHARGE, PROCEDURE AND POWER SHUT OFF METHOD FOR POWER CIRCUIT

WARNING

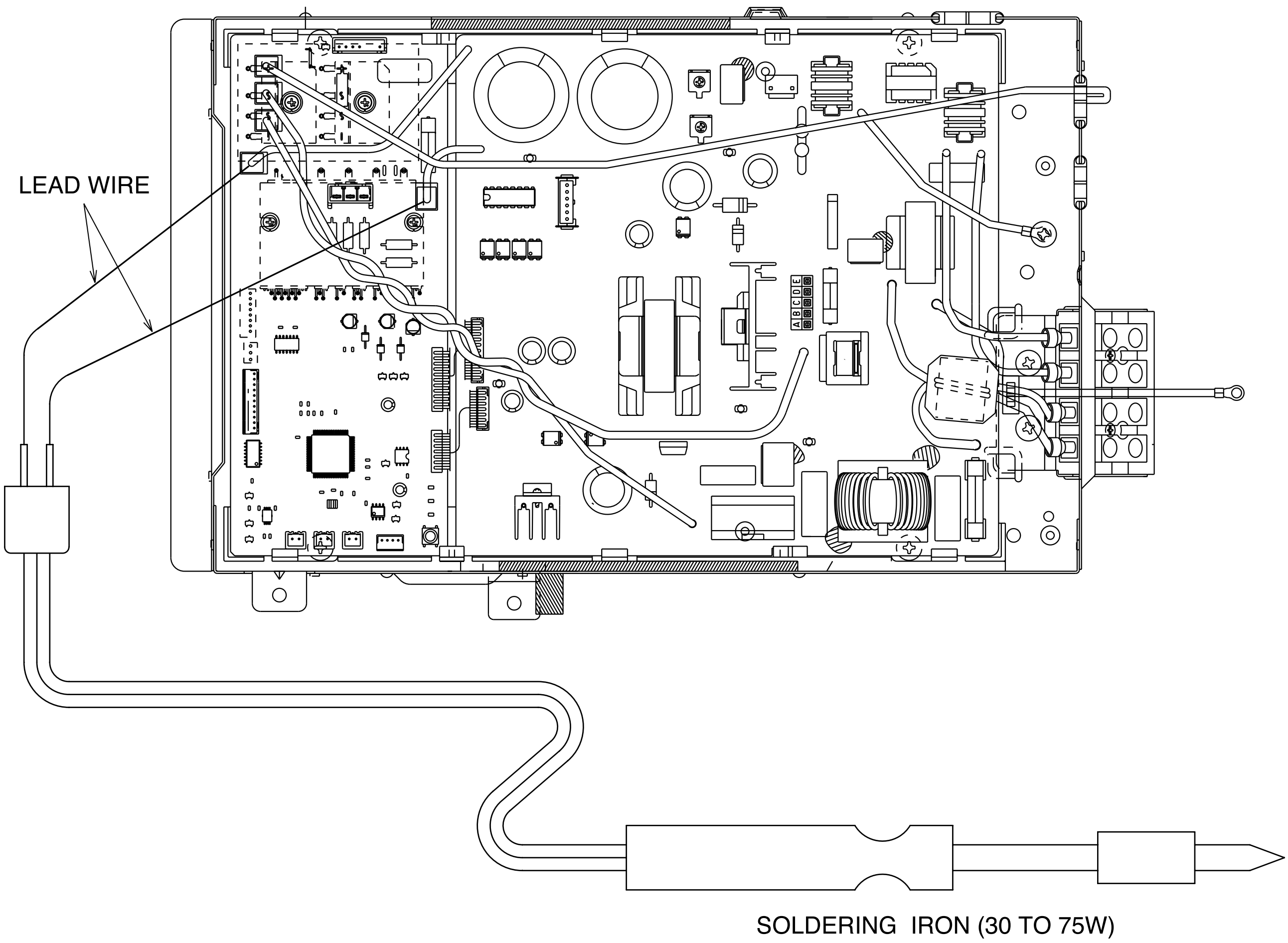
Caution

- Voltage of about 350 V is charged between the terminal of smoothing capacitors (400μF x 2).
- During continuity check for each circuit part of the outdoor unit, be sure to discharge the smoothing capacitors.

Discharge Procedure

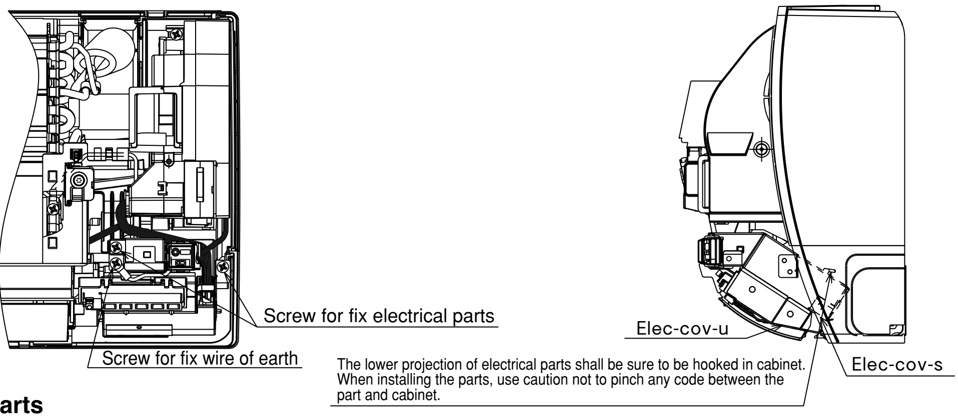
1. Turn off the power of the indoor unit or pull out the power supply plug.
2. After power is turned off, wait for 10 minutes or more. Then, remove electrical parts cover and apply soldering iron of 30 to 75 W for 15 seconds or more to TAB3(GRAY) and TAB4(RED) terminals on the main P.W.B. as shown in the figure below, in order to discharge voltage in smoothing capacitor.

Do not use a soldering iron with transformer: Otherwise, thermal fuse inside transformer will be blown.



STRUCTURE OF AN INDOOR UNIT ELECTRIC PARTS

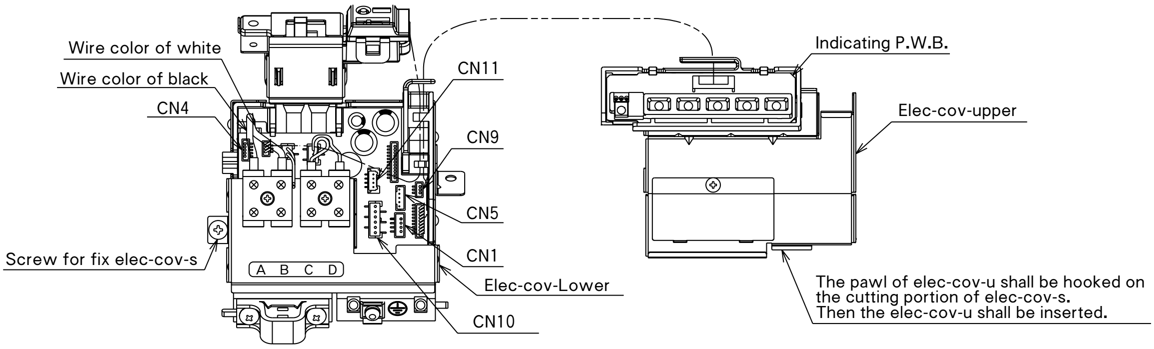
MODEL RAS-25JX5, RAS-35JX5

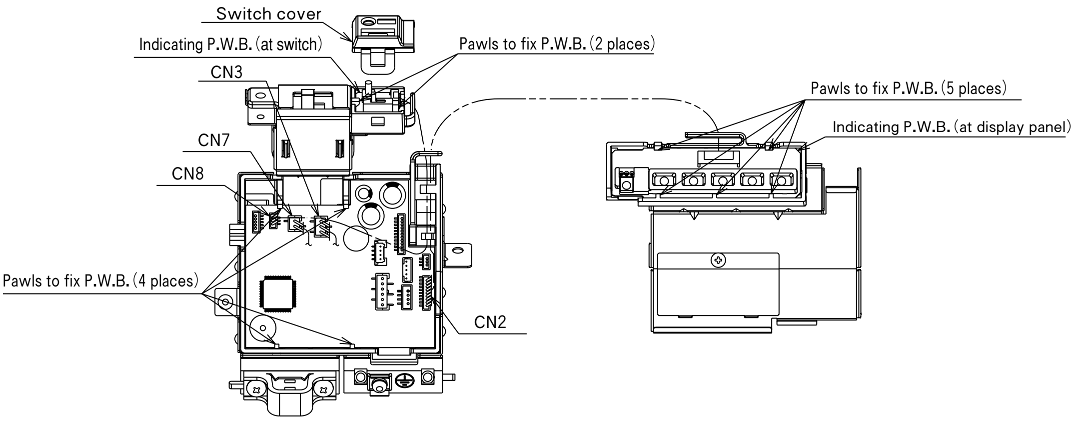


Removing electrical parts

1. Removing elec-cov-u. However, be cautious as indicating P.W.B. is attached to the cover.
2. Remove the connectors of CN1 (Thermistor), CN4 (Stepping motor for auto sweep), CN5 (Ventilation damper motor), CN9 (Gas sensor), CN10 (Indoor fan motor) and CN11 (Ventilation fan motor) from control P.W.B.
3. Remove the fixing screw for electric part (2 places) and earth wire then remove the electric parts.

※ In case the connector cannot be removed in the step2. above, remove the securing screws for electric part cover S, CN3, CN7 connecters and black and white wire of terminal A,B and then remove the electric part cover.





HOW TO REMOVE CONTROL P.W.B.

1. Remove the securing screws for electric part cover S, CN3, CN7 connecters and black and white wire of terminal A,B and then remove the electric part cover S.
2. Remove the CN2, Cn8 connecters from the control P.W.B.
3. Remove the upper part of securing pawls (2 places) and then remove the board.

HOW TO REMOVE INDICATING P.W.B. (at display panel)

1. Remove CN2 connecters from the control P.W.B. (or indicating P.W.B.).
2. Remove the upper part of securing pawls (2 places) and then remove the board.

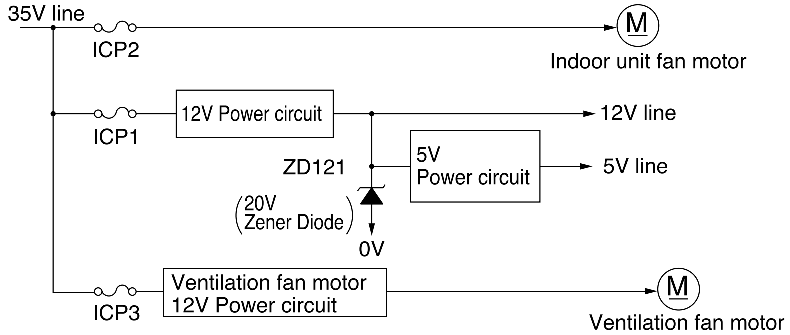
HOW TO REMOVE INDICATING P.W.B. (at switch)

1. Remove CN8 connecters from the control P.W.B. (or indicating P.W.B.).
2. Remove the right side of securing pawls and then remove the board.

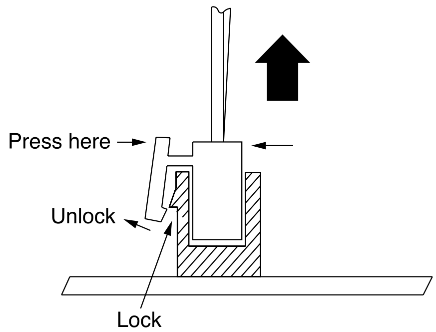
Other Cautions

(1) Cautions concerning ICP (IC Protector)

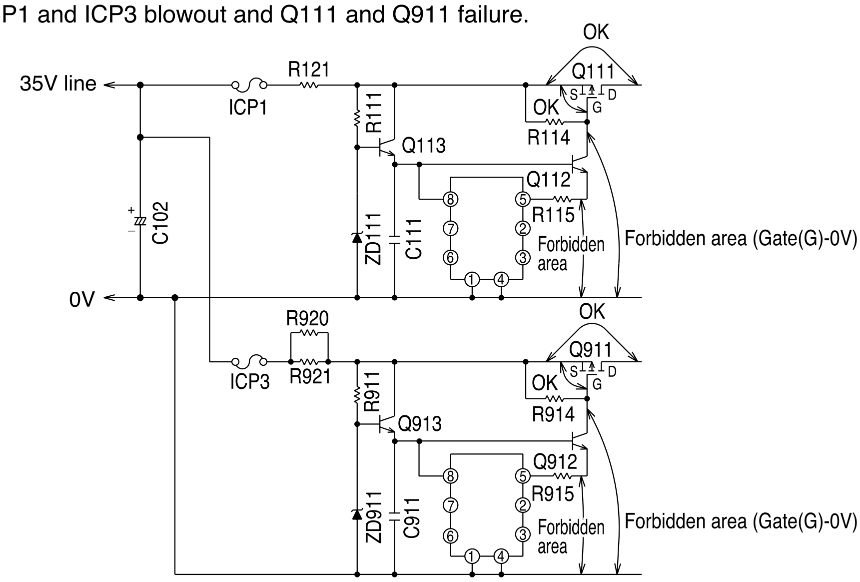
1. Use due caution for short circuit in servicing.
   Short circuit will open the ICP immediately.
2. When the ICP opens, remove the cause of this phenomenon and replace the ICP.
   If the remedy is improper, the ICP may open again.



(2) The CN3 (power suppy) and CN7 (temperature fuse) and CN10 (fan motor) and CN11 (ventilation fan motor) are the connectors with lock mechanism.
Press the lock with your fingers to unlock and remove the connector.



(3) When checking the voltage and waveform, do not connect the probes to the forbidden areas show below. Touching them may cause the ICP1 and ICP3 blowout and Q111 and Q911 failure.



The Q111 and Q911 is a MOS-FET and its gate terminal is a high impedance. When a probe such as a multimeter is contacted with the gate Ⓖ, the Q111 and Q911 may have the continuous ON state to supply overcurrent in the circuit, causing the ICP1 and ICP3 blowout and Q111 and Q911 failure.

When checking the switching waveform of the Q111 and Q911, set the source Ⓢ to the base and measure the gate Ⓖ and drain Ⓓ.

(4) During power feeding to the P.W.B., do not remove and insert the CN10 (fan motor connector) and CN11 (Vertilation fan motor connector). Failure to do so may cause overcurrent to the fan motor and P.W.B.s (microcomputer, IC and the like) and a failure may occur. To remove or insert the CN10 and CN11, be sure to shut off the power.

THE SUPPORT FUNCTION OF FAILURE DIAGNOSIS

No.	Function Name	Description
1	Self-diagnosis indication function <Indication on the indoor unit side>	• The "timer lamp" indicates the failure mode detected on the indoor unit side by its blinking frequency while the "filter lamp" indicates the failure mode detected on the outdoor unit side by its frequency. • A failure detected on the outdoor unit side will be indicated by the blinking "filter lamp" after retry operation has been performed several times. For some failure modes, only the retry operation is repeated without lamp indication. <Failure modes with repeated retry operation and without indoor unit lamp indication are as follows:-> OH thermistor temperature rise Outdoor unit communication error Abnormal supply voltage Failure with low occurrence frequency
	<Indication on the outdoor unit side>	• The “LD301” indicates the failure mode detected on the outdoor unit side by its blinking frequency. Upon failure detection, the outdoor unit will shut down and the LD301 continues to blink until the unit is restarted. (In the event of communication errors, the LD301 continues to blink until communication is restored.)
2	Self-diagnosis memory	• Failure modes detected on indoor and outdoor unit sides are stored in the non-volatile memory of the indoor unit. These modes can be read later. (This memory is retained even if the power is turned off.) • Data of the failure modes detected on the outdoor unit side is written in the memory every time a failure occurs, so the failure mode can be checked on the indoor unit side without retry operation. In addition, minor failure modes which are not indicated by usual self-diagnosis indication function are also stored in the memory and indicated. (These minor failure modes may not be stored in the memory in case of outdoor communication error.) • The past 5 failure modes are stored in the memory. • There is a function to erase the memory. Using the memory clear function, failure symptom with low occurrence frequency can also be detected by reading and checking the failure modes in the memory every few days.
3	Self-diagnosis of communication circuit	• This is a function to perform self-diagnosis of communication circuit to identify the failure part on the communication circuit of the indoor and outdoor unit sides. • This function is used for detailed diagnosis in the event that any abnormality on communication circuit is suspected.

Self-Diagnosis Memory Function

This function is to display the diagnosed failure modes stored in the non-volatile memory of the indoor unit by remote controller operation.
This is effective to check the failure mode in the case where the power was turned off or operation was restarted without checking the lamp blinking frequency. (The past 5 failure modes are stored in the memory.)
Failure modes with low occurrence frequency, which are too minor to be indicated on the indoor unit, are also stored in the memory. This helps service personnel detect failure symptoms that cannot be checked during visit by clearing the memory and then checking the memory contents on a later day.

<How to redisplay the diagnosed failure modes >

1. Set the power switch on the main unit to “OFF”.
2. Set the remote controller display to the stop mode.
3. Set the operation mode to “cooling” with the “Function Selector” button on the remote controller.
4. Set the power switch on the main unit to “ON”.
5. Set the temperature on the remote controller to “32°C”.
6. Set the fan speed according to the failure information to be displayed. (Refer to the table on the right for fan speed setting for failure data.)
7. Press the “START/STOP” button while pressing the “Temperature (∧)” button.
   (Remote controller transmits the signal.)
8. Failure mode is redisplayed after a short beep is heard from the main unit.

Fan speed setting for failure data

Fan speed	Data
AUTO	Latest
HI	2nd latest
MED	3rd latest
LOW	4th latest
SILENT	Oldest

<How to clear failure diagnosis data>

1. Perform the redisplay of the diagnosed failure mode. (Refer to the above procedures.)
2. Set the power switch on the main unit to “OFF”.
3. Set the operation mode to “warming” with the “Function Selector” button on the remote controller.
4. Set the power switch on the main unit to “ON”.
5. Set the temperature on the remote controller to “16°C”.
6. Press the “START/STOP” button while pressing the “Temperature (∧)” button.
(Remote controller transmits the signal.)
7. Failure mode is redisplayed after a long beep for 1 second is heard from the main unit

Notes
- This function is effective only once immediately after the power is turned on. If the remote controller is operated for another function, this function does not work.
  In addition, note that this function may not work if procedures other than the above are performed.
  (If this function does not work, turn off the power and retry it.)
- If nothing is in the memory, the lamp does not blink even if the redisplay operation is performed.
- After the redisplay operation or clearing of data, the remote controller operation is not received by air conditioner.
  Turn off the power before performing ordinary operation.

TROUBLESHOOTING WHEN TIMER LAMP BLINKS.

MODEL RAS-25JX5, RAS-35JX5

Perform troubleshooting according to the number of times the indoor timer lamp.

SELF-DIAGNOSIS LIGHTING MODE

MODEL RAS-25JX5, RAS-35JX5

	No.	Blinking of Timer lamp	Reason for indication	Possible cause
	1	2sec. ------------- 1 time	Reversing valve defective When the indoor heat exchanger temperature is too low in the heating mode or it is too high in the cooling mode.	(1) Reversing valve defective (2) Heat exchanger thermistor disconnected (only in the heating mode) (Note) The malfunction mode is entered the 3rd time this abnormal indication appears (read every 3 minutes).
	2	2sec. ----------- 2 times	Outdoor unit is under forced operation When the outdoor unit is in forced operation or balancing operation after forced operation	Electrical parts in the outdoor unit
	3	2sec. ---------- 3 times	Indoor/outdoor interface defective When the interface signal from the outdoor unit is interrupted.	(1) Indoor interface circuit (2) Outdoor interface circuit
	4	2sec. ----- 9 times	Room thermistor or heat exchanger thermistor is faulty When room thermistor or heat exchanger thermistor is opened circuit or short circuit.	(1) Room thermistor (2) Heat exchanger thermistor
	5	2sec. --- 10 times	Over-current detection at the DC fan motor when over-current is detected at the DC fan motor of the indoor unit.	(1) Indoor fan locked (2) Indoor fan motor (3) Indoor control P.W.B.
※1	6	2sec. --- 13 times	IC401 data reading error When data read from IC401 is incorrect.	IC401 abnormal
※2	7	2sec. --- 16 times	Ventilation fan abnormal Ventilation fan motor does not rotate	(1) Ventilation fan locked (2) Ventilation fan motor (3) Indoor control P.W.B.
※2	8	2sec. --- 17 times	Dirt sensor(Gas sensor) abnormal Dirt sensor disconnection or short circuit.	(1) Dirt sensor circuit (2) Disconnection of dirt sensor connector or lead wire

(▮ --- Lights for 0.35 sec. at interval of 0.35 sec.)

Perform troubleshooting according to the number of times of the indoor filter lamp blink.

	No.	Filter lamp blink mode	Reason of indication	Possible cause
	1	2 sec. ----------- 2 times	Peak current cut	Reference the outdoor self diagnosis lamp blinks, to perform the trobleshooting.
	2	2 sec. ---------- 3 times	Abnormal low speed rotation	
	3	2 sec. -------- 4 times	Switching failure	
	4	2 sec. ----- 5 times	Overload lower limit cut	
※2	5	2 sec. ----- 6 times	OH thermistor temp. rise	
	6	2 sec. ----- 7 times	Outdoor thermistor abnormal	
	7	2 sec. ----- 8 times	Acceleration defective	
※2	8	2 sec. ----- 9 times	Communication error	
※2	9	2 sec. ---- 10 times	Abnormal power source	
	10	2 sec. ---- 12 times	Fan lock error	
	11	2 sec. ---- 13 times	Defective EEPROM of outdoor unit	

(--- Lights for 0.35 sec. at interval of 0.35 sec.)

<CAUTION>

(1) If the indoor unit does not work at all, check the connection error or disconnection of F cable.
(2) If the interface circuit is failed from the time the power is turned on, failure indication by lamp blinking on the indoor unit cannot be made. For diagnosis of interface circuit, use the self-diagnosis function of communication circuit or self-diagnosis memory function.
(3) Some failure modes are displayed only when reading the self-diagnosis memory. (※2)
(4) “Outdoor forced operation” is not stored in the self-diagnosis memory.
(5) Remote controller operation cannot be received while the timer lamp or filter lamp is blinking. To check the operation one more time, turn off the power and turn it on again. (Except for ※1)

SELF-DIAGNOSIS LIGHTING MODE

MODEL RAC-25JX5, RAC-35JX5

DANGER (DC350V)

- CUT THE POWER SOURCE AND WAIT MORE THAN 10 MINUTES BEFORE SERVICE WORK.
- CONFIRM THE DC VOLTAGE AT THE MEASURING POINT SHOWN IN FIGURE MUST BE LESS THAN 10V.
- DO NOT TOUCH THE OTHER COMPONENTS WHEN OPERATING THE SERVICE SWITCH.

SERVICEOPERATION

PROCEDURE OF REFRIGERANT PUMP DOWN OR INDEPENDENT OPERATION OF OUTDOOR UNIT.

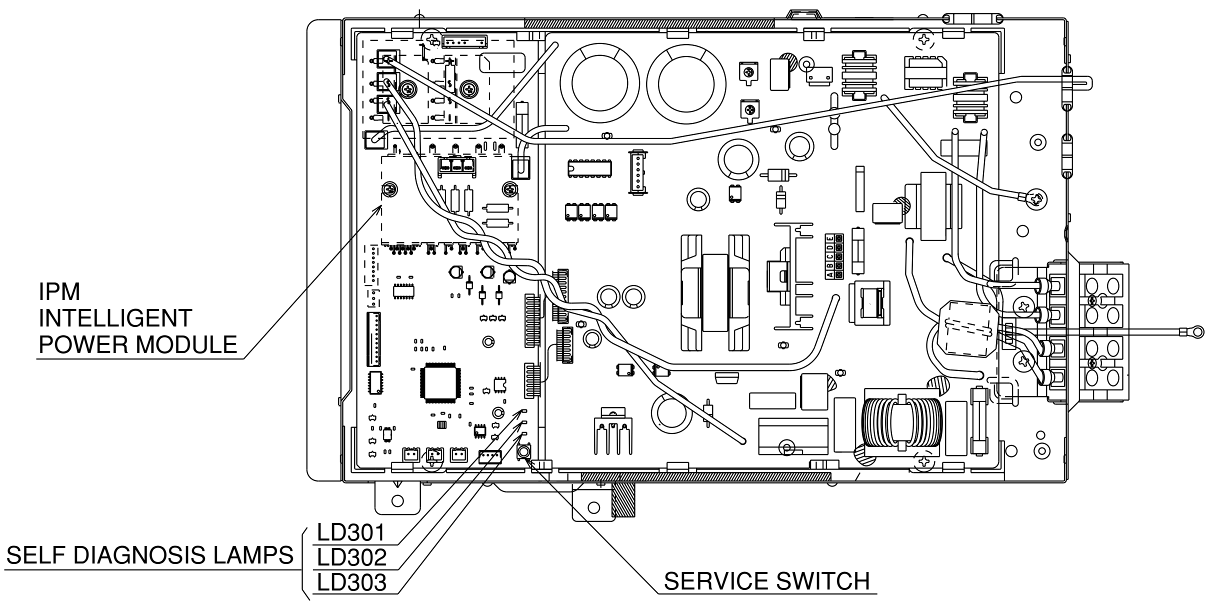
1. CUT OFF THE POWER SOURCE ONCE THEN ON AGAIN.
2. WAIT 1 MINUTE AT LEAST.
3. PRESS THE SERVICE SWITCH (WHICH IS ON THE PWB) MORE THAN 1 SECOND.

SERVICE OPERATION WILL BE STARTED.
TO STOP THIS OPERATION, PRESS THE SERVICE SWITCH AGAIN (MORE THAN 1 SECOND).
TO RESUME TO NORMAL OPERATION, CUT THE POWER SOUCE ONCE THEN ON AGAIN.
IN ORDER TO PROTECT THE DAMAGE OF COMPRESSOR, DO NOT OPERATE MORE THAN 5 MINUTES WITH SERVICE VALVE CLOSE.

SELF-DIAGNOSIS LIGHTING MODE ■:LIGHT ▨:BLINK □:OFF

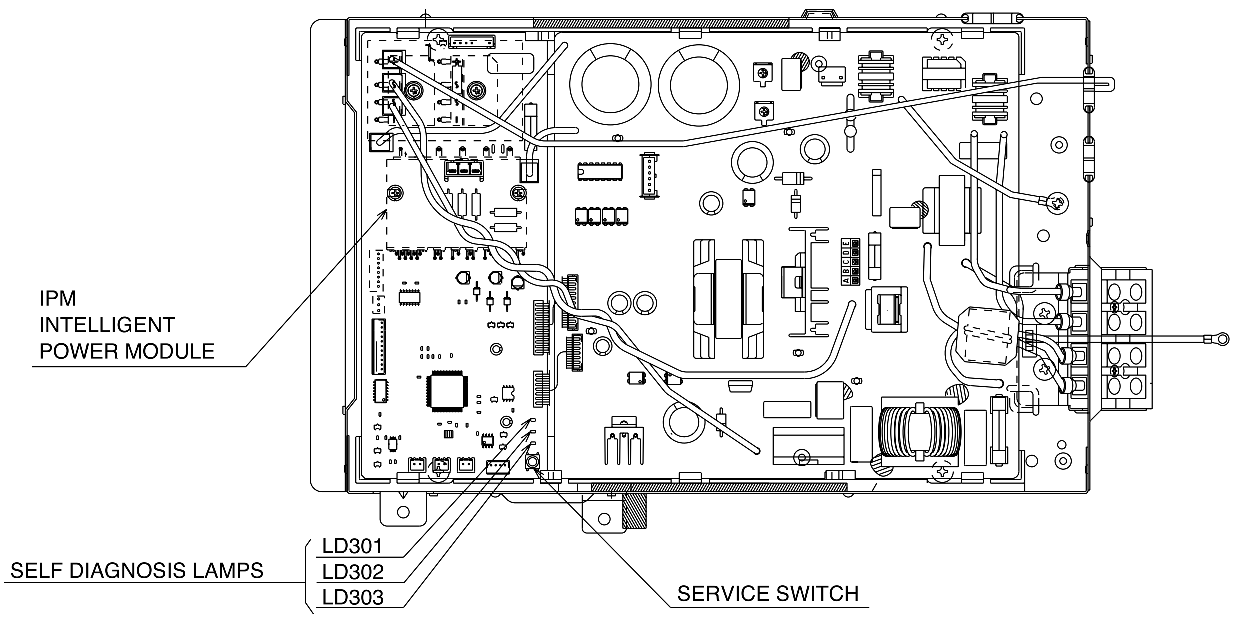
LD301	LD302	SELF-DIAGNOSIS NAME	DETAILS	MAIN CHECK POINT
		[1] DURING OPERATION	LD303 (RED) LIGHTS. ■	
□	□	NORMAL OPERATION	COMPRESSOR OPERATION	NOT MALFUNCTION
■	□	OVERLOAD (1)	ROTATION SPEED (1) (2) SET VALUE (3) TIME THE ROTATION SPEED IS AUTOMATICALLY CONT-ROLLED TO PROTECT THE COMPRESSOR IN THE OVERLOAD CONDITION.	THIS SHOWS AN OVERLOAD PROTECTION STATUS. NOT MALFUNCTION.
□	■	OVERLOAD (2)		
■	■	OVERLOAD (3)		
		[2] DURING STOP	LD303 (RED) GOES OFF. □	
□	□	NORMAL STOP	STOPPED BY THERMOSTAT OR CONTROLLER.	NOT MALFUNCTION.
▨ 1TIME	□	RESET STOP	MICROPROCESSOR WAS REBOOTED. (IT IS NORMAL WHEN POWER SW HAS BEEN TURNED ON)	①POWER P. W. B. ②MAIN P. W. B.
▨ 2TIMES	□	PEAK CURRENT CUT	COMPRESSOR PEAK CURRENT WAS BEYOND MAXIMUM LIMIT.	①MAIN P. W. B. ②POWER P. W. B. ③COMPRESSOR
▨ 3TIMES	□	ABNORMAL LOW SPEED ROTATION	LOST THE COMPRESSOR ROTOR POSITION.	①MAIN P. W. B. ②POWER P. W. B. ③COMPRESSOR
▨ 4TIMES	□	SWITCHING FAILURE	SWITCHING FROM LOW FREQUENCY SYNC START TO POSITION DETECTION OPERATION FAILURE.	①MAIN P. W. B. ②POWER P. W. B. ③COMPRESSOR
▨ 5TIMES	□	OVERLOAD LOWER LIMIT CUT	OVERLOAD PROTECTION FUNCTION IS REQUESTING LOWER SPEED THAN MINIMUM SPEED OF COMPRESSOR.	①OUTDOOR UNIT IS EXPOSED TO DIRECT SUNLIGHT OR ITS AIRFLOW BLOCKED. ②FAN MOTOR ③MAIN P. W. B. ④THE VOLTAGE IS EXTREMELY LOW.
▨ 6TIMES	□	OH THERMISTOR TEMP. RISE	COMPRESSOR OVERHEAT WAS DETECTED BY OH THERMISTOR.	①LEAK OF REFRIGERANT ②COMPRESSOR ③OH THERMISTOR CIRCUIT (MAIN P. W. B.)
▨ 7TIMES	□	THERMISTOR ABNORMAL	ABNORMAL THERMISTOR VALUE (OPEN OR SHORT) WAS DETECTED.	①THERMISTOR ②CONNECTION OF THERMISTOR DEFECTIVE ③THERMISTOR CIRCUIT
▨ 8TIMES	□	ACCELERATION FAILURE	COMPRESSOR WAS NOT ACCELERATED MORE THAN MINIMUM SPEED.	①LEAK OF REFRIGERANT ②COMPRESSOR
▨ 9TIMES	□	COMMUNICA-TIONS ERROR	COMMUNICATIONS BETWEEN INDOOR UNIT AND OUTDOOR UNIT ARE INTERRUPTED	①CABLE IS WRONG CONNECTED ②CABLE IS OPEN ③INTERFACE CIRCUIT OF BETWEEN INDOOR UNIT AND OUTDOOR UNIT
▨ 10TIMES	□	ABNORMAL POWER SOURCE	ABNORMAL POWER SOURCE WAS DETECTED	①ABNORMAL POWER SOURCE ②CABLE IS WRONG CONNECTED ③POWER P. W. B. ④MAIN P. W. B.
▨ 12TIMES	□	FAN LOCK ERROR	OUTDOOR FAN RPM IS NOT ROTATE AS INTENDED RPM	①FAN MOTOR ②FAN MOTOR CIRCUIT
▨ 13TIMES	□	EEPROM READ ERROR	MICROCOMPUTER CANNOT READ THE DATA IN EEPROM.	①MAIN P. W. B.

※EXAMPLE OF BLINKING (5 TIMES) ■■■■■ 2SEC ■ ■ ··LIGHTS FOR 0.25 SEC AT INTERVAL OF 0.25 SEC.



OUTDOOR UNIT

Remove the compressor connector.



If your first attempt fails, wait 3 minutes (for the unit to re-start) and check the self-diagnosis lamp status again.

With the unit set in the operating state, press the start/stop button.
Does the unit operate for approximately 2 seconds (the LD303 coming on) and then stop due to a failure of switching (the lamp blinking 4 times)?

Yes

- Check the drive circuit (IMP) using the PRD checker.
- Check the position sensor circuit.

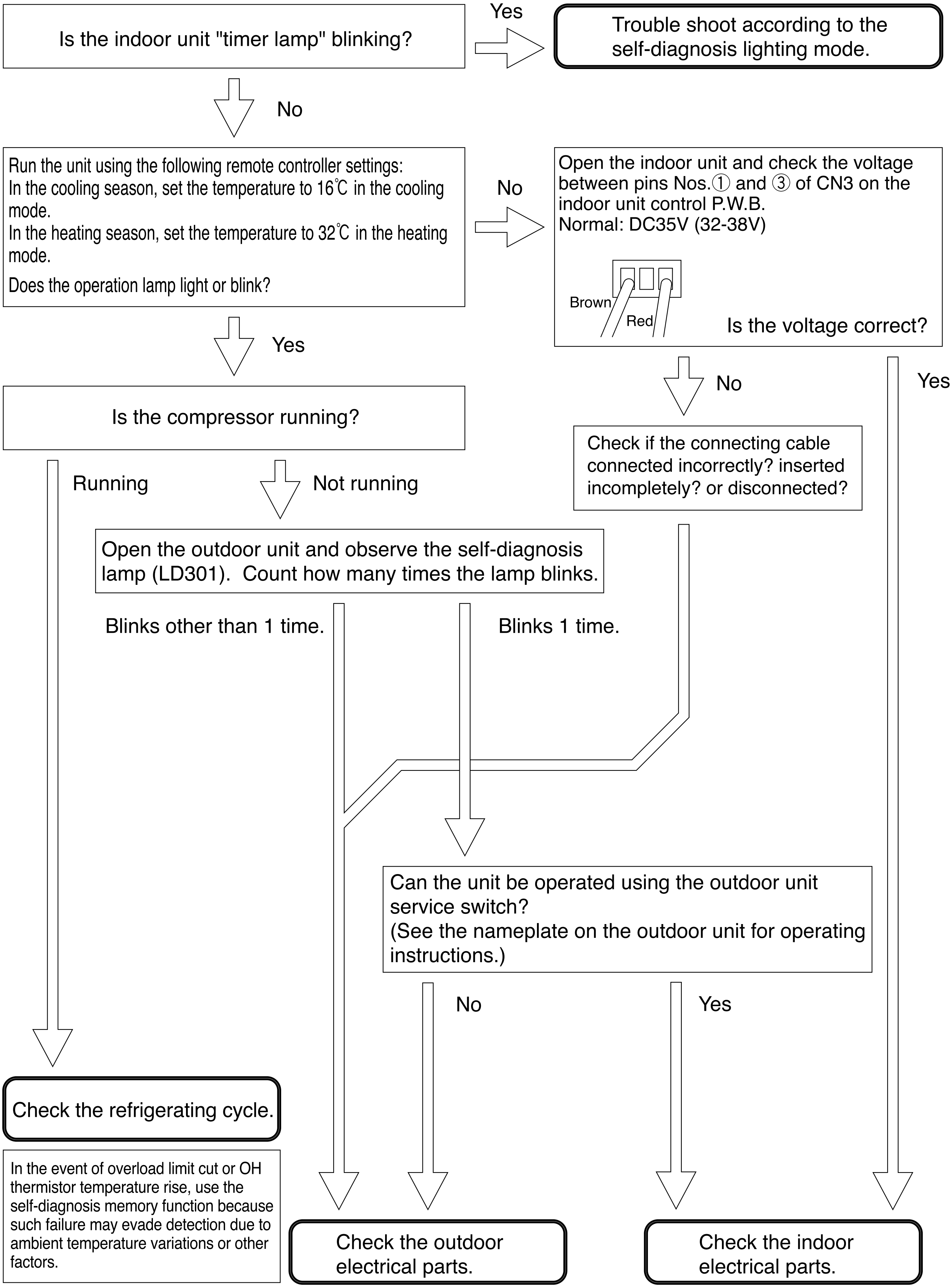
Normal

Check the refrigerating cycle.

No

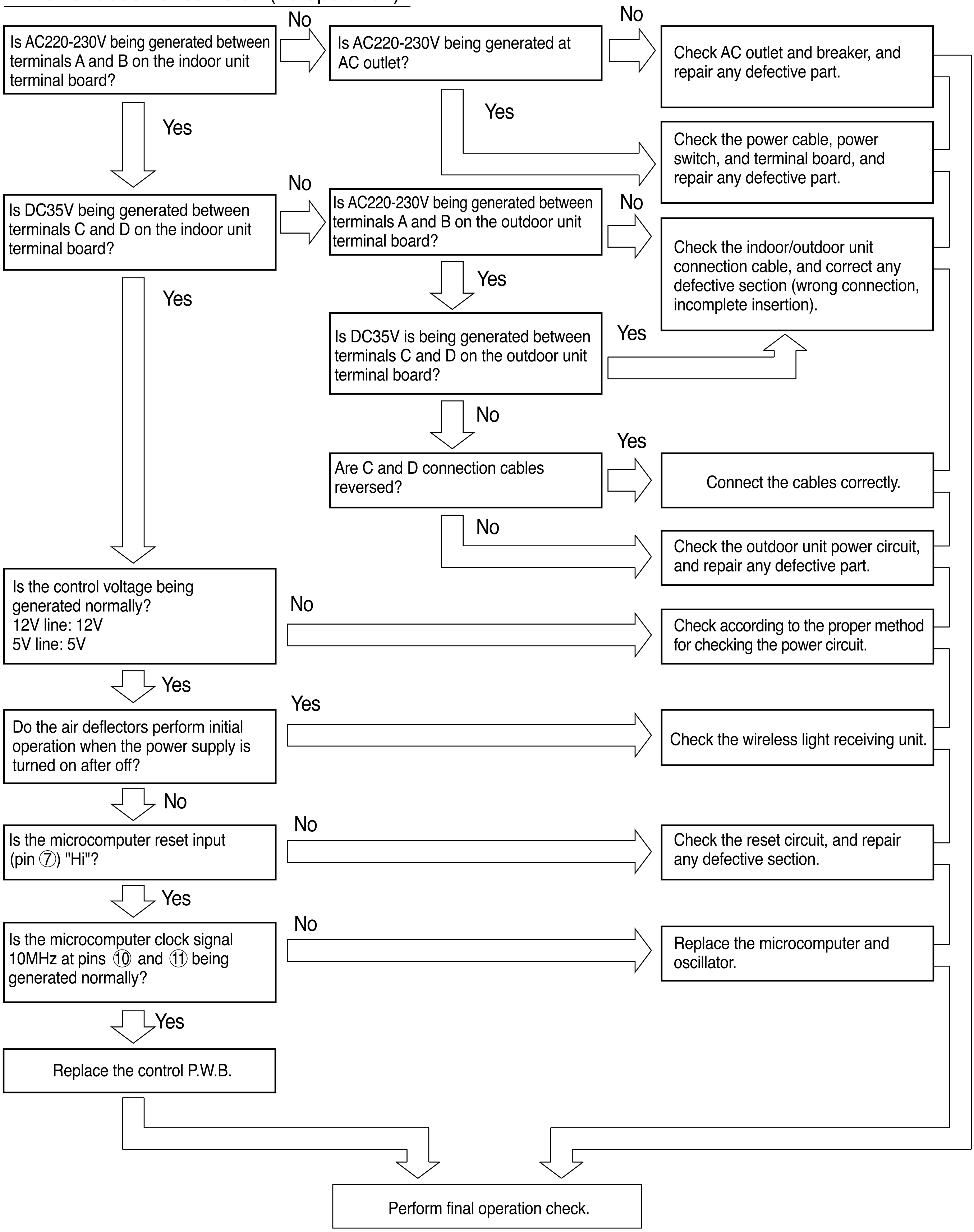
Check outdoor electrical parts.

CHECKING THE INDOOR/OUTDOOR UNIT ELECTRICALPARTS AND REFRIGERATING

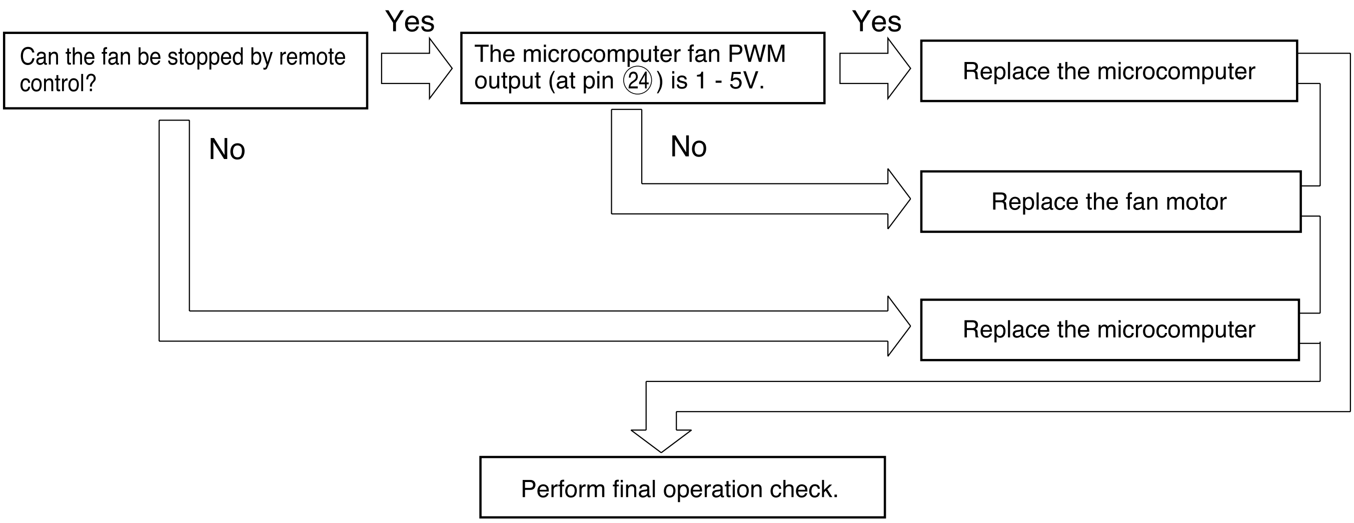


CHECKING THE INDOOR UNIT ELECTRICAL PARTS

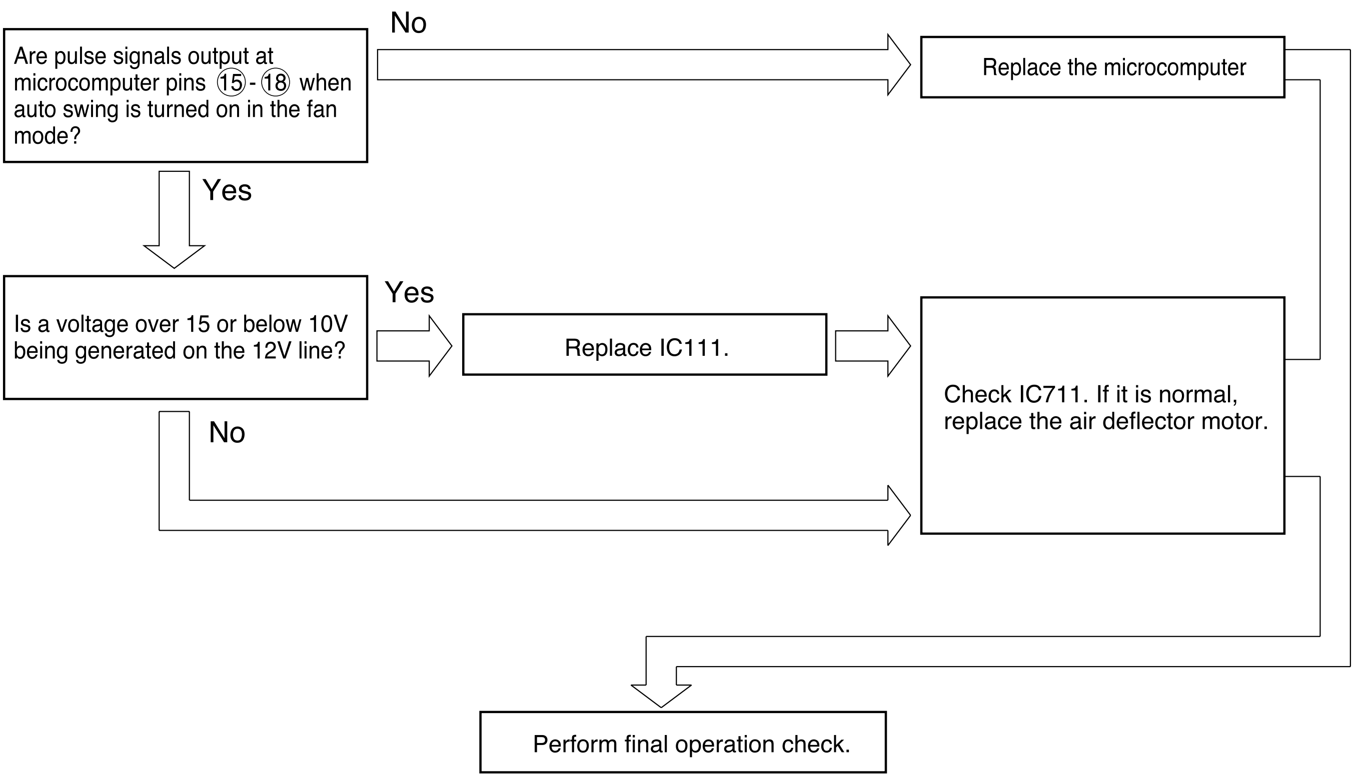
1. Power does not come on (no operation)



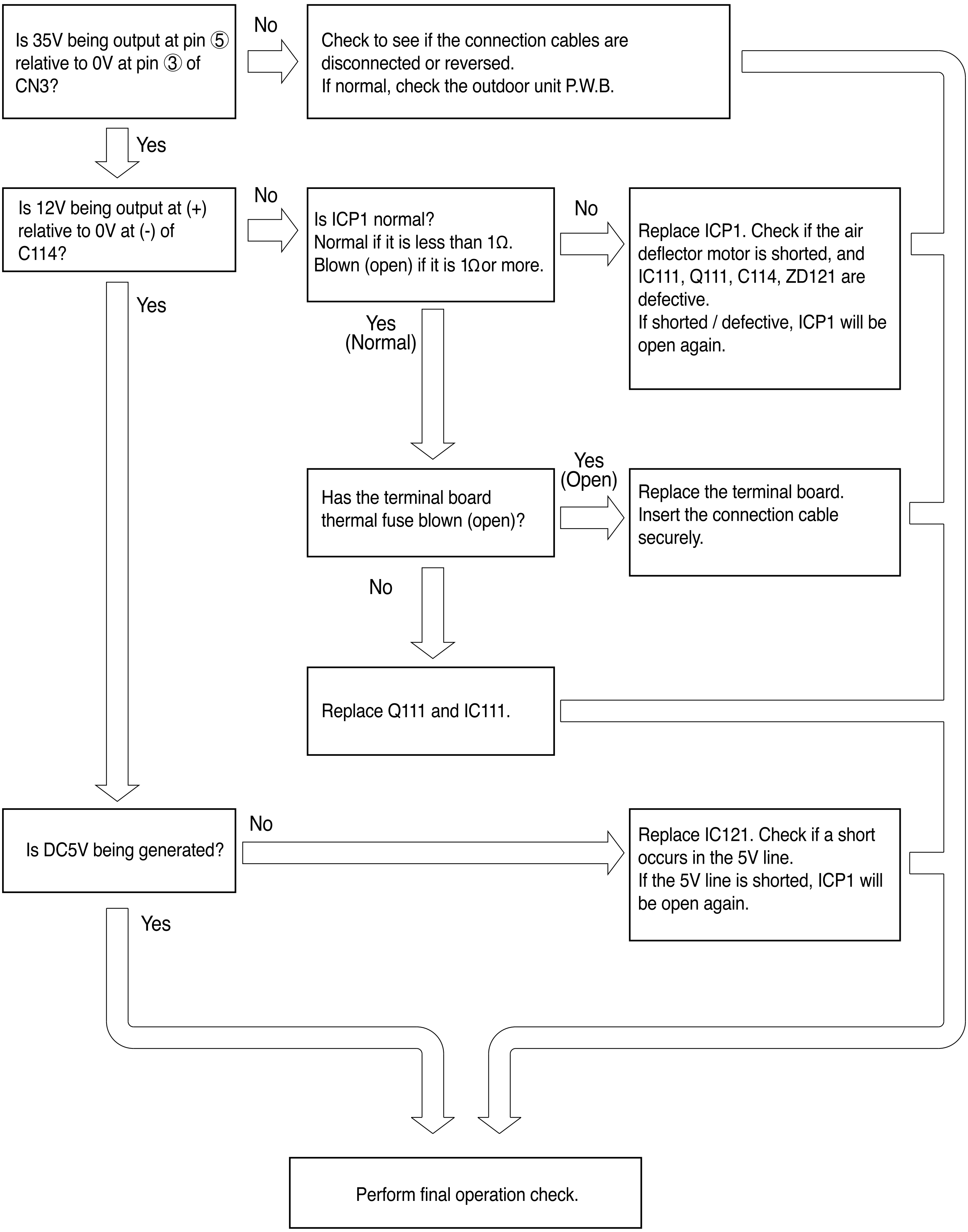
2. Indoor fan does not operate (others are normal)



3. Air deflector does not move (others are normal)



4. Check the control P.W.B. (power circuit)



5. Failure Phenomenon: Ventilation fan motor does not operate

<Situation> Ventilation fan motor does not operate.
Two way air exchange lamp blinks (lit for 4 seconds and off for 1 second).
"Timer lamp blinks 16 times" is not stored in the self-diagnosis memory.

<Assumed points of failure>

- Mechanical lock of ventilation fan
- Coming off of the connector or wiring disconnection of ventilation fan motor
- Ventilation fan motor
- Ventilation fan motor drive circuit

<Caution>

- If the two way air exchange switch is set to "fresh air in operation inhibited" or "fresh air in and exhaust operation inhibited" position, operation of the ventilation fan motor is limited.

<Diagnosis flow>

Troubleshooting start

Is the connector (CN11) of the ventilation fan motor inserted securely? Is there wiring disconnection?

- No → Repair the connector or wiring.
- Yes ↓

Does voltage of approximately 12V exist between ① and ② pin of the connector (CN11) of the ventilation fan motor?
Does voltage of approximately 5V (PWM signal) exist between ② and ③ pin?

- No → Replace "control board".
- Yes ↓

Is there any factor to mechanically disturb rotation of the ventilation fan?

- Yes → Remove the factor of mechanical lock.
- No ↓

Replace "Ventilation fan motor".

6. Failure Phenomenon: Two way air exchange lamp blinks

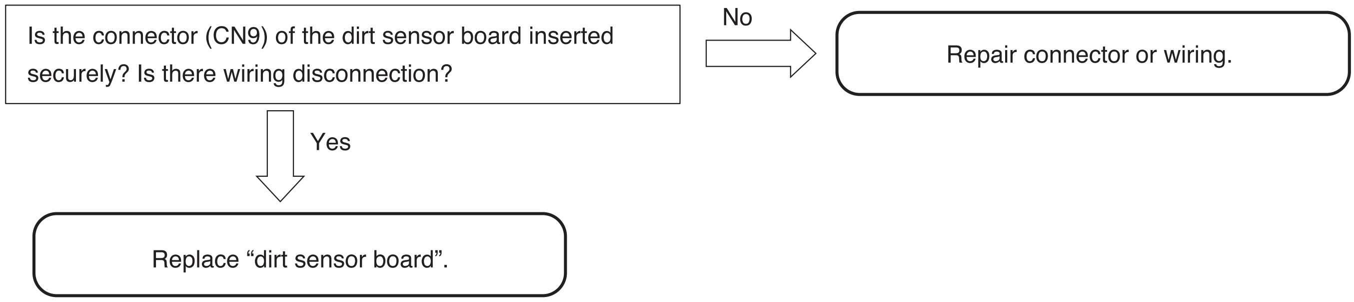
<Situation> Two way air exchange lamp blinks (lit for 4 seconds and off for 1 second).
Dirt sensor is not functioning.
"Timer lamp blinks 17 times" is not stored in the self-diagnosis memory.

<Assumed points of failure>
- Incomplete insertion of the connector of dirt sensor (Gas sensor) board
- Dirt sensor

<Caution>
- Self-diagnosis (failure detection) of dirt sensor is performed at the time when automatic two way air exchange is set.

<Diagnosis flow>

Troubleshooting start



CHECKING THE REMOTE CONTROLLER

Is battery polarity correct?

- No → Install the battery in the correct polarity. → Check functions again.
- Yes ↓

Is the battery check sign [+ −] flashing?

- Yes → Replace the battery. → Check functions again.
- No ↓

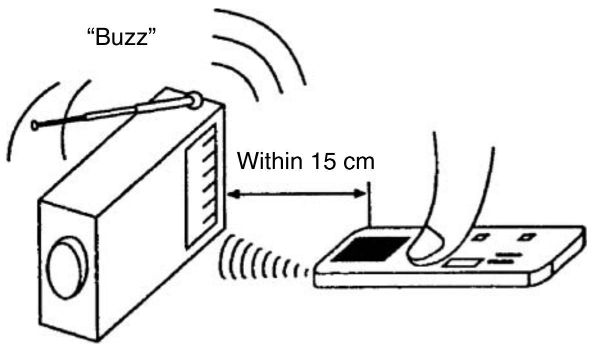
Turn on an AM radio, bring the remote control switch within 15 cm of the radio, and press the ON/OFF button.

↓

Does the radio buzz noisily?

- No → Replace the battery. / Check the LED (D1) with a multimeter. → Check functions again.
- Yes ↓

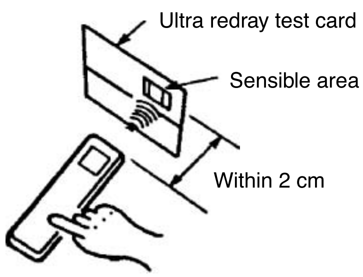
Check the indoor unit signal receiving P. W. B.
If it is good, check the main P. W. B.



Check functions again.
If it does not work, replace the remote controller.

You can check the remote control switch by other methods as explained below.

Using the test card



The sensible area should flash in orange when you operate the remote control unit if it is good.

⚠ WARNING ⚠

PRECAUTIONS FOR SERVICING
Be sure that the power switch is turned off or the power cable is disconnected before servicing.

Removing the P.W.B.s.

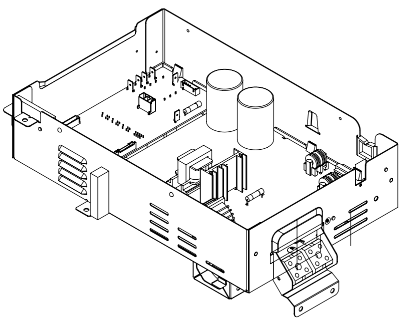
System Configuration of Outdoor Unit Electrical Parts.
The outdoor unit electrical parts consist of two P.W.B.s as shown in the figure.

<Main P.W.B. (M board)>
Contains a rectifier circuit and inverter module, their controlling microcomputer and microcomputer peripheral control circuits. The board incorporates high and low current sections.

<Power P.W.B. (P board)>
Contains a switching power circuit, noise filter, power factor improvement circuit, etc.
The switching power circuit supplies power to electronic circuits on the Main P.W.B. through CN3.
※ When replacing any P.W.B, disconnect all the cab les (including ground wires).

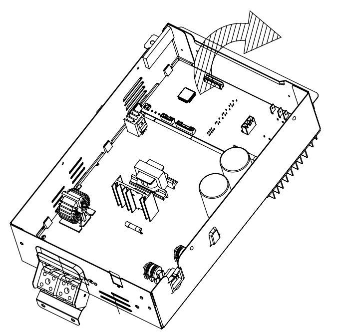
[A. Main P.W.B.]

1 Remove four screws securing the Main P.W.B. to the cooling fins, and remove the Main P.W.B. from the cooling fins.



2 Open the support latches and raise the Main P.W.B. in the direction of the arrow as shown in Fig. A.

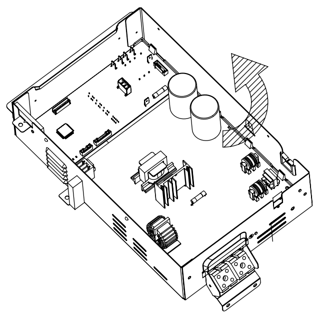
<Direction of the Main P.W.B. removal>



[B. Power P.W.B.]

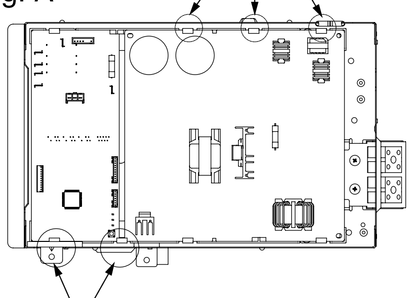
1 Open the support latches and raise the power P.W.B. in the direction of the arrow as shown in Fig. A.

<Direction of the power P.W.B. removal>



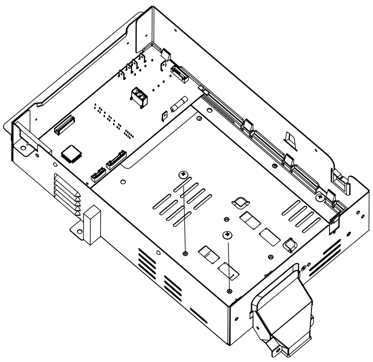
Open these support latches to remove the power P.W.B.

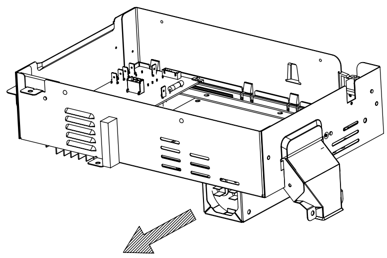
Fig. A



Open these support latches to remove the Main P.W.B.

[C. Power Factor Improvement capacitor]
Designed to improve power factor.
To replace the capacitor, remove the power P.W.B. and then:
1. Remove two screws fastening the capacitor seat.
2. Slide the capacitor seat in the direction of the arrow.

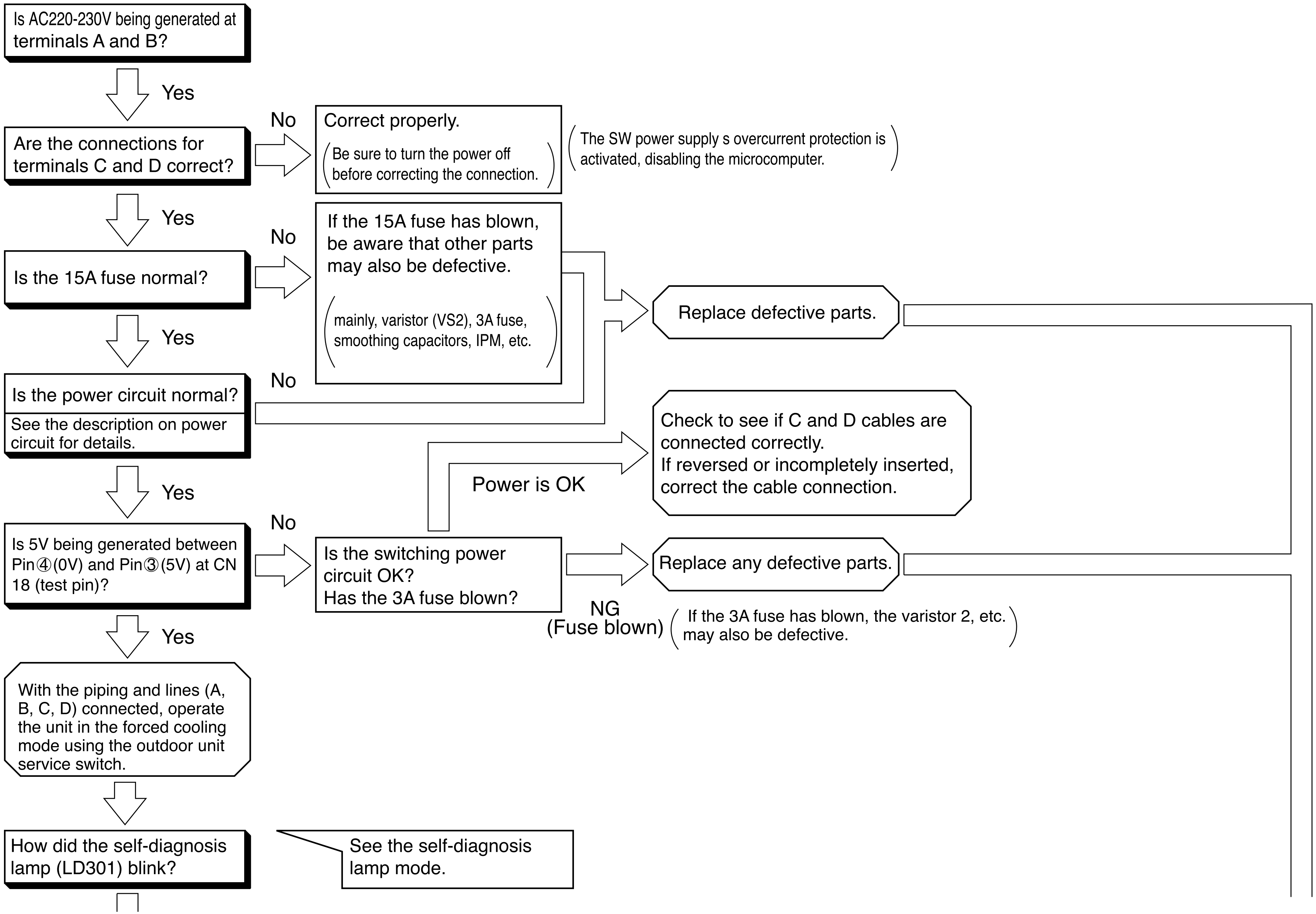


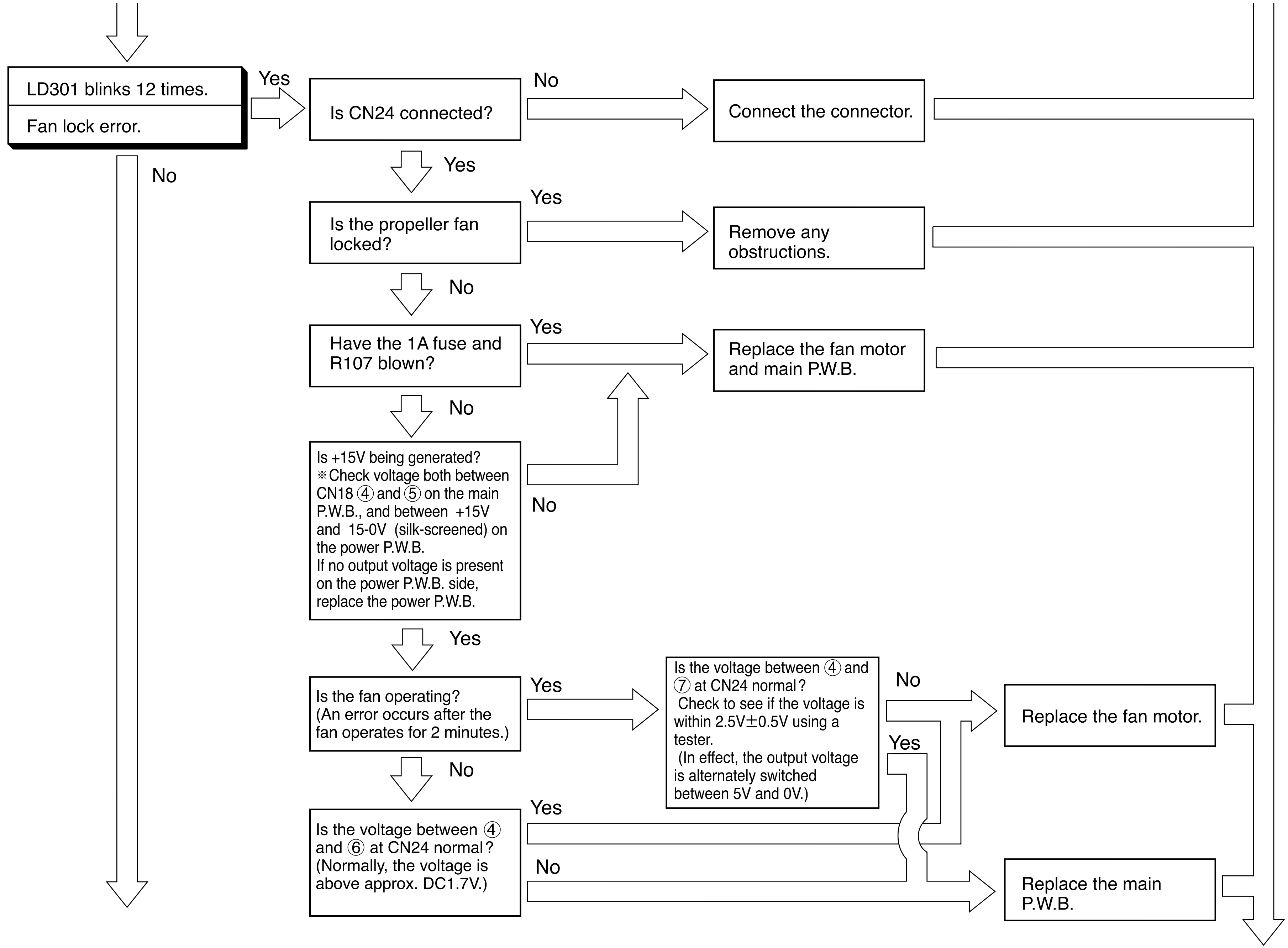


Sliding Direction

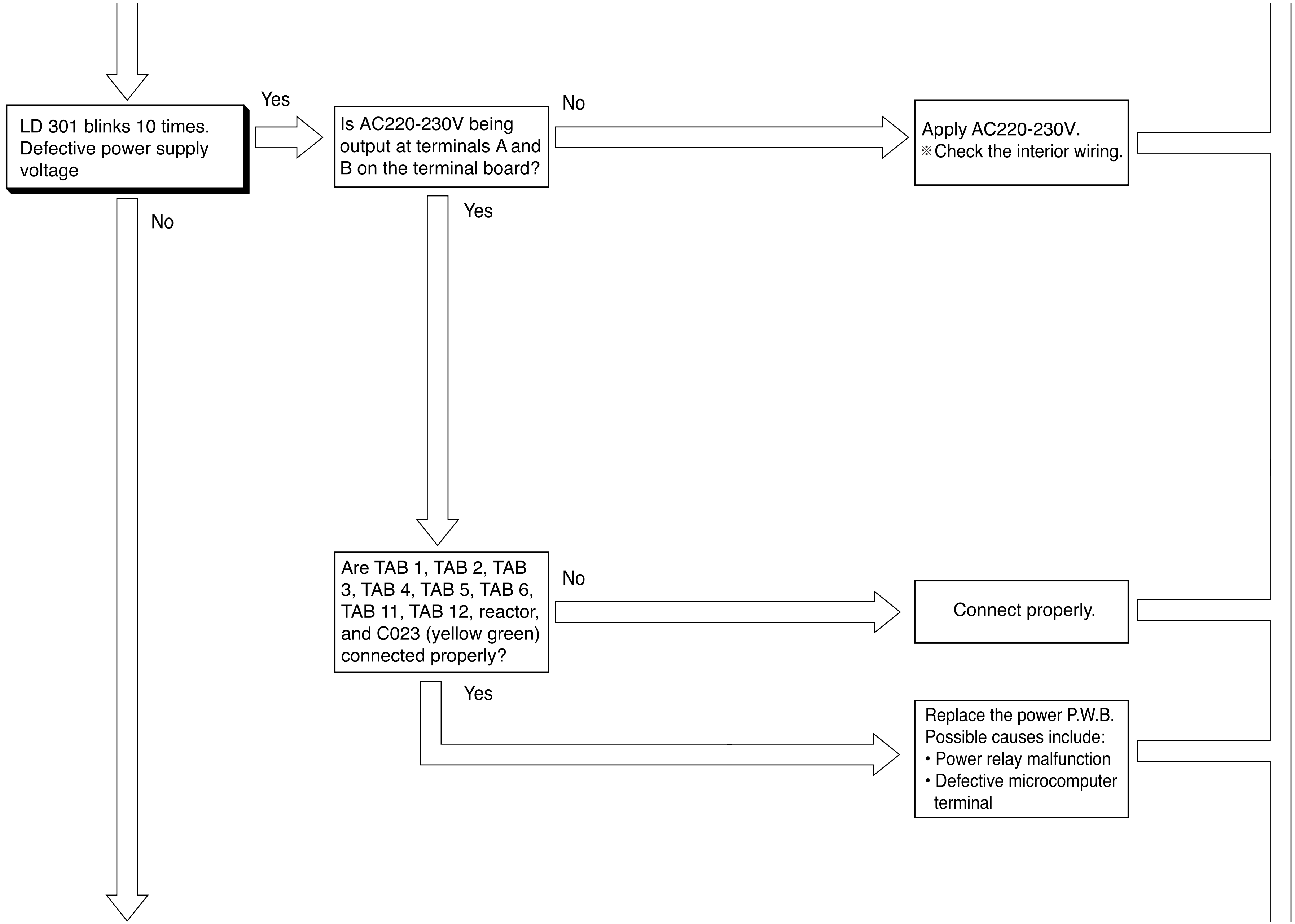
CHECKING OUTDOOR UNIT ELECTRICAL PARTS

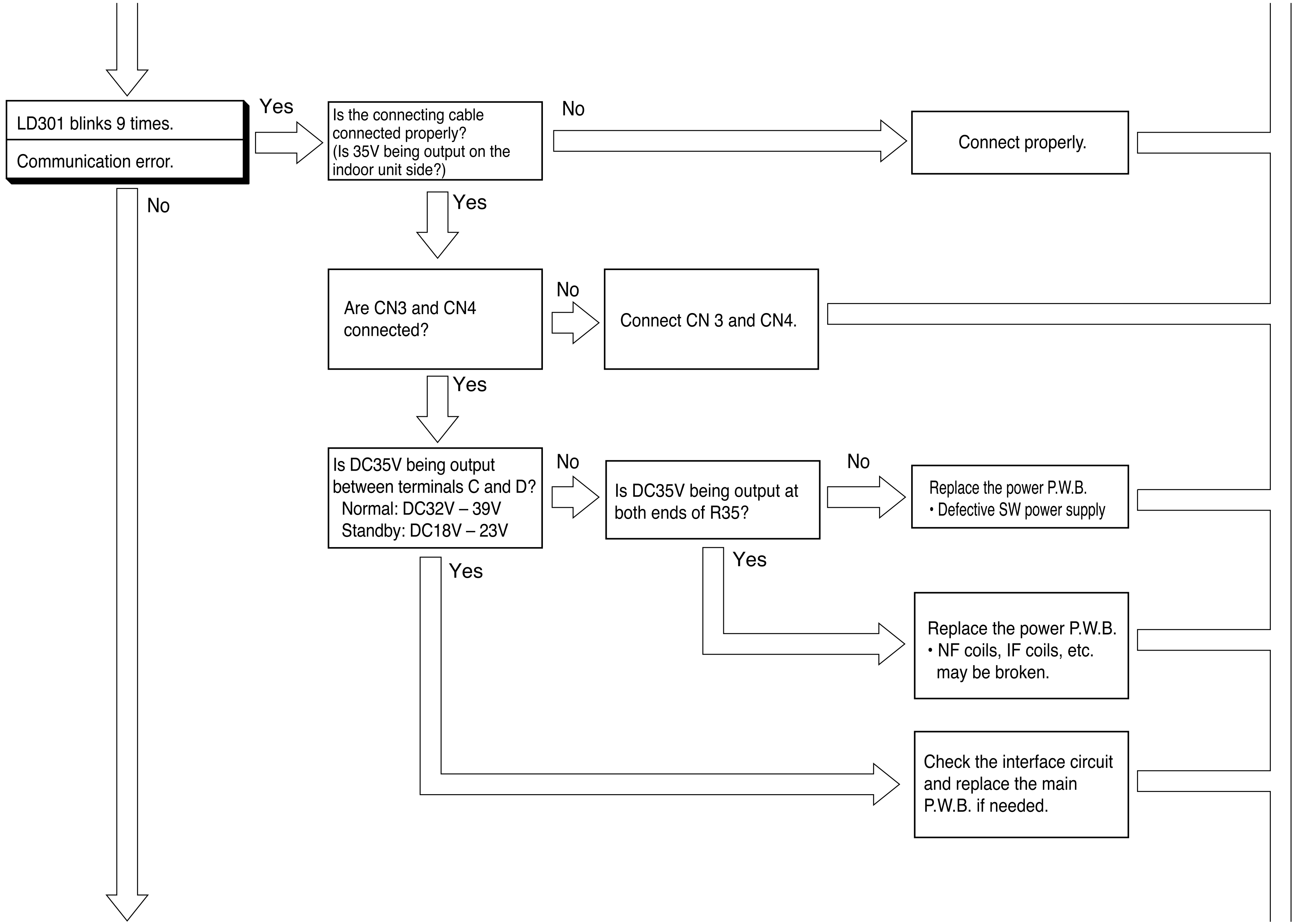
[No operation or abnormal operation]

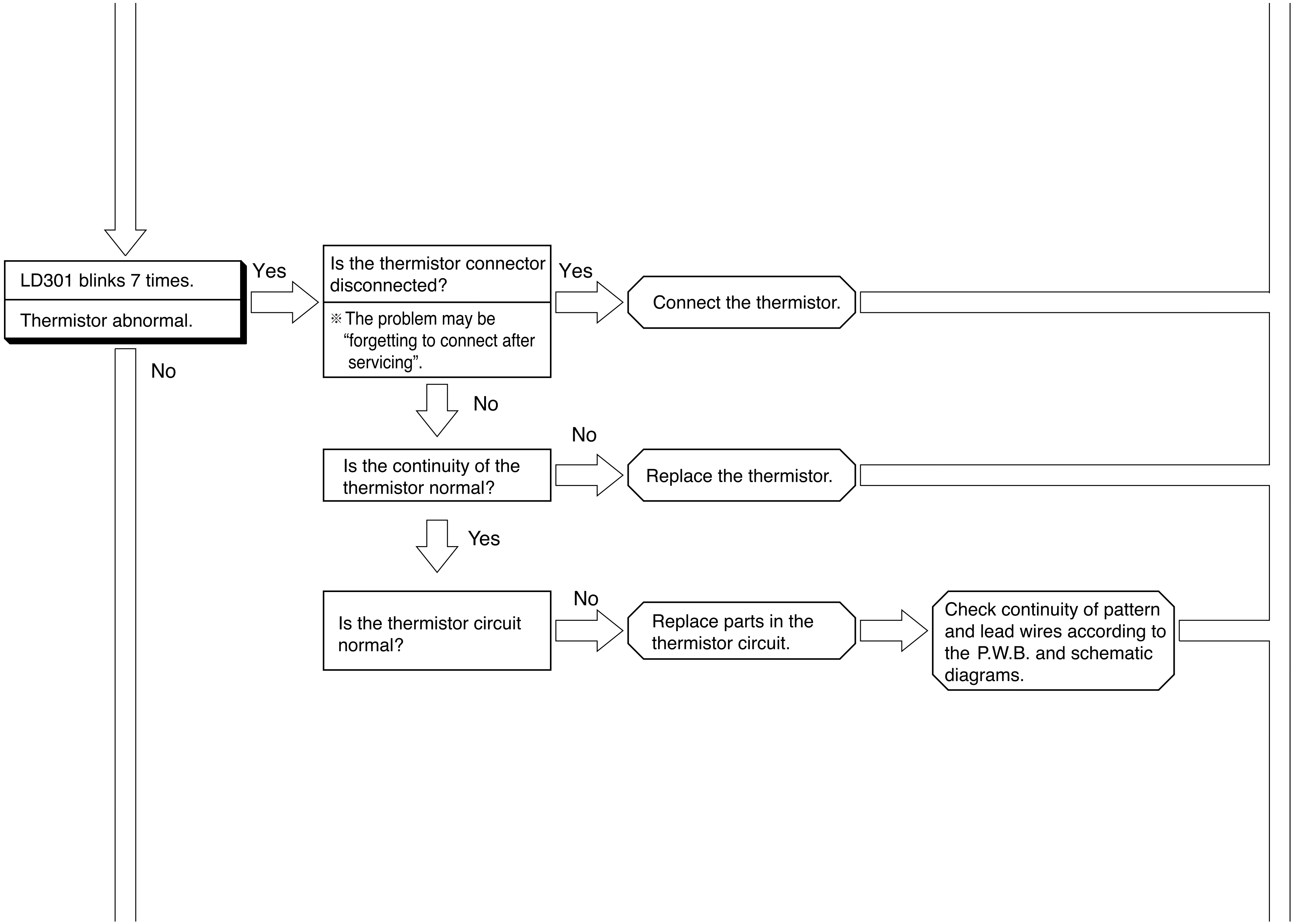


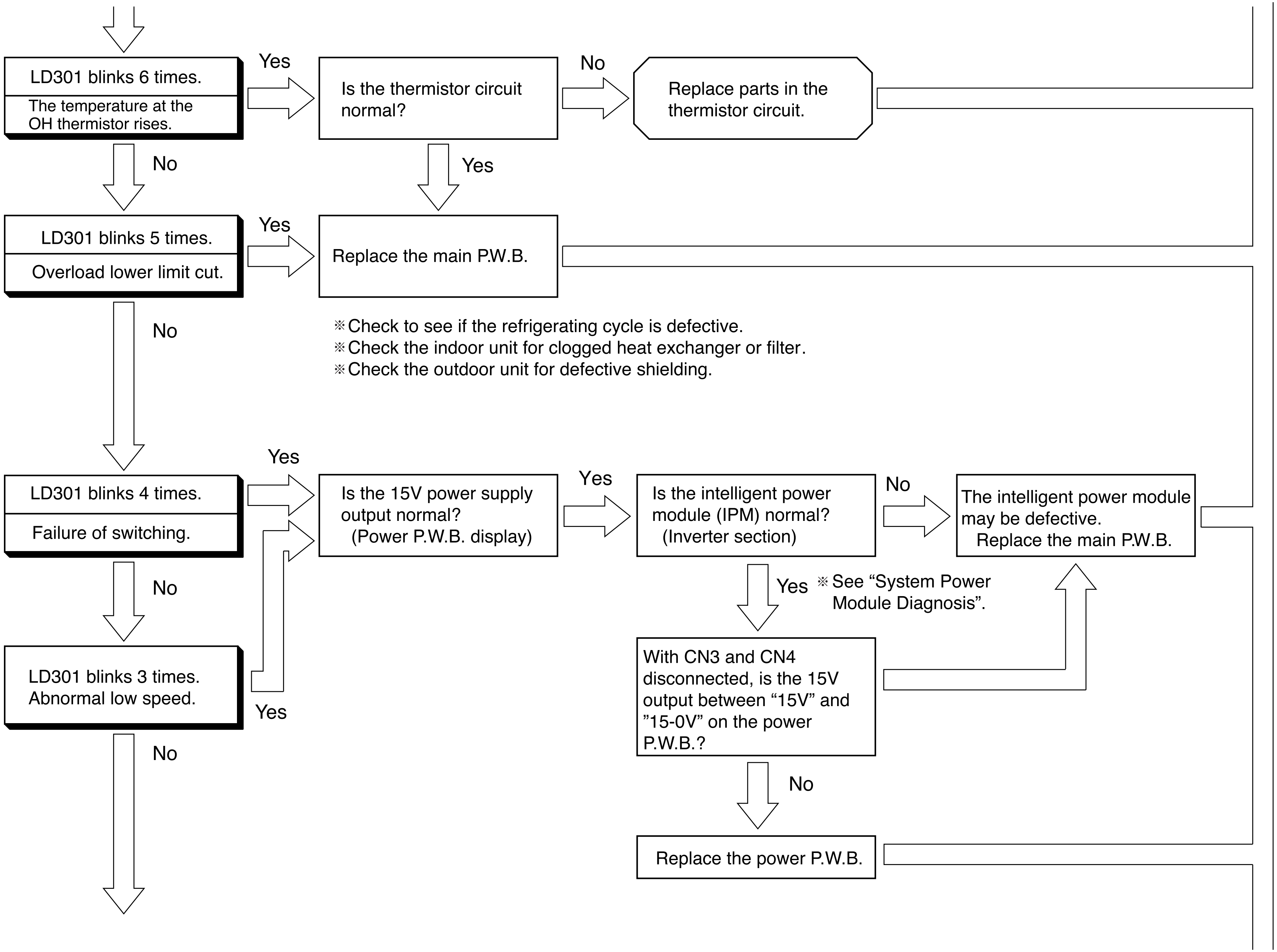


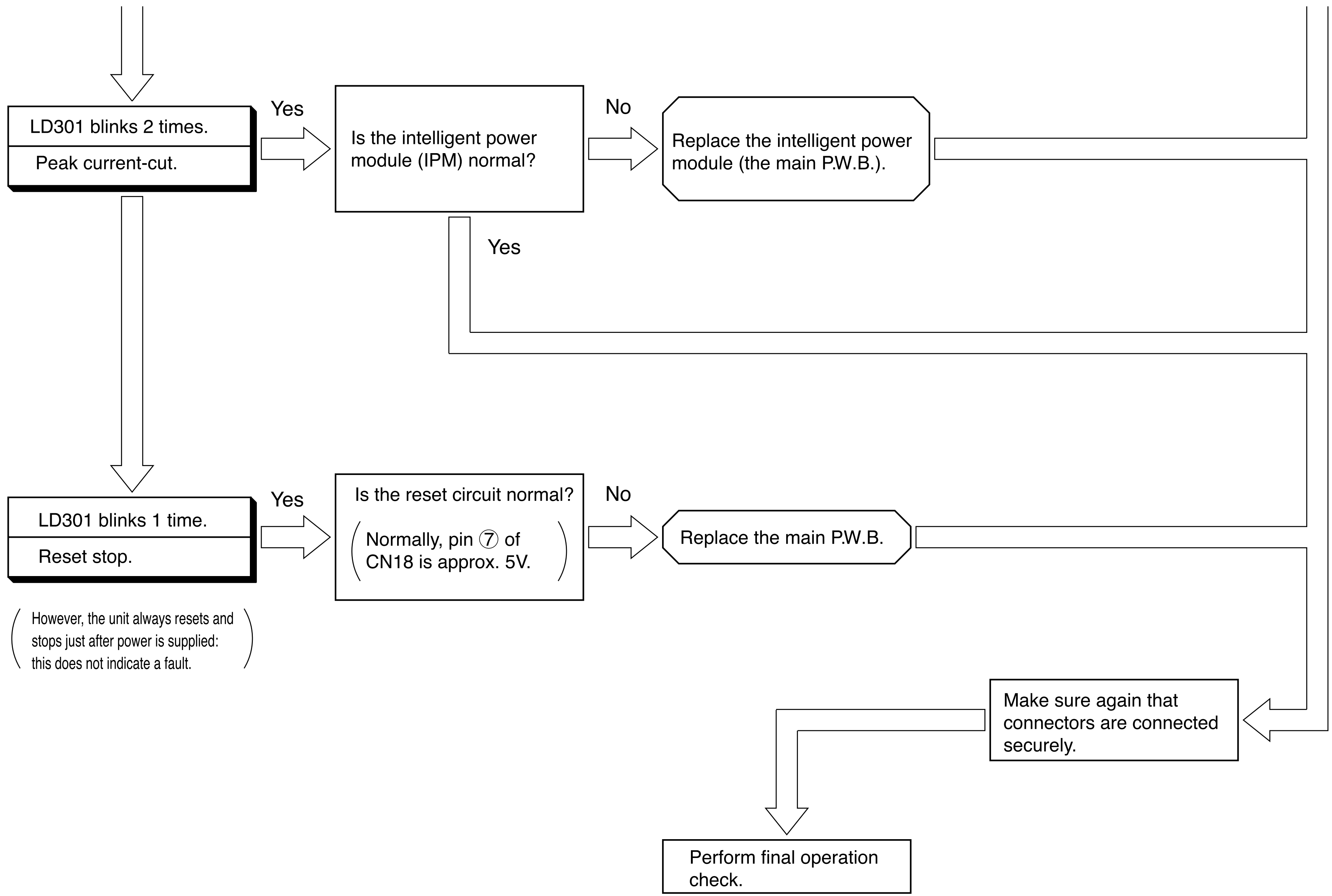
LD301 blinks 12 times.
Fan lock error.
Yes
No
Is CN24 connected?
No
Connect the connector.
Yes
Is the propeller fan locked?
Yes
Remove any obstructions.
No
Have the 1A fuse and R107 blown?
Yes
Replace the fan motor and main P.W.B.
No
Is +15V being generated?
※Check voltage both between CN18 ④ and ⑤ on the main P.W.B., and between +15V and 15-0V (silk-screened) on the power P.W.B.
If no output voltage is present on the power P.W.B. side, replace the power P.W.B.
No
Yes
Is the fan operating?
(An error occurs after the fan operates for 2 minutes.)
Yes
Is the voltage between ④ and ⑦ at CN24 normal?
Check to see if the voltage is within 2.5V±0.5V using a tester.
(In effect, the output voltage is alternately switched between 5V and 0V.)
No
Replace the fan motor.
Yes
No
Is the voltage between ④ and ⑥ at CN24 normal?
(Normally, the voltage is above approx. DC1.7V.)
Yes
No
Replace the main P.W.B.


LD 301 blinks 10 times.
Defective power supply
voltage
Yes
No
Is AC220-230V being
output at terminals A and
B on the terminal board?
No
Yes
Apply AC220-230V.
※Check the interior wiring.
Are TAB 1, TAB 2, TAB
3, TAB 4, TAB 5, TAB 6,
TAB 11, TAB 12, reactor,
and C023 (yellow green)
connected properly?
No
Yes
Connect properly.
Replace the power P.W.B.
Possible causes include:
• Power relay malfunction
• Defective microcomputer
terminal


LD301 blinks 9 times.
Communication error.
Yes
No
Is the connecting cable connected properly? (Is 35V being output on the indoor unit side?)
No
Connect properly.
Yes
Are CN3 and CN4 connected?
No
Connect CN 3 and CN4.
Yes
Is DC35V being output between terminals C and D? Normal: DC32V – 39V Standby: DC18V – 23V
No
Is DC35V being output at both ends of R35?
No
Replace the power P.W.B. • Defective SW power supply
Yes
Replace the power P.W.B. • NF coils, IF coils, etc. may be broken.
Yes
Check the interface circuit and replace the main P.W.B. if needed.


LD301 blinks 7 times.
Thermistor abnormal.
Yes
No
Is the thermistor connector disconnected?
※ The problem may be "forgetting to connect after servicing".
Yes
Connect the thermistor.
No
Is the continuity of the thermistor normal?
No
Replace the thermistor.
Yes
Is the thermistor circuit normal?
No
Replace parts in the thermistor circuit.
Check continuity of pattern and lead wires according to the P.W.B. and schematic diagrams.


LD301 blinks 6 times.
The temperature at the OH thermistor rises.
Yes
Is the thermistor circuit normal?
No
Replace parts in the thermistor circuit.
Yes
No
LD301 blinks 5 times.
Overload lower limit cut.
Yes
Replace the main P.W.B.
※Check to see if the refrigerating cycle is defective.
※Check the indoor unit for clogged heat exchanger or filter.
※Check the outdoor unit for defective shielding.
No
LD301 blinks 4 times.
Failure of switching.
Yes
Is the 15V power supply output normal?
(Power P.W.B. display)
Yes
Is the intelligent power module (IPM) normal?
(Inverter section)
No
The intelligent power module may be defective.
Replace the main P.W.B.
Yes
※See "System Power Module Diagnosis".
With CN3 and CN4 disconnected, is the 15V output between "15V" and "15-0V" on the power P.W.B.?
No
Replace the power P.W.B.
No
LD301 blinks 3 times.
Abnormal low speed.
Yes
No


LD301 blinks 2 times.
Peak current-cut.
Yes
Is the intelligent power module (IPM) normal?
No
Replace the intelligent power module (the main P.W.B.).
Yes
LD301 blinks 1 time.
Reset stop.
(However, the unit always resets and stops just after power is supplied: this does not indicate a fault.)
Yes
Is the reset circuit normal?
(Normally, pin ⑦ of CN18 is approx. 5V.)
No
Replace the main P.W.B.
Make sure again that connectors are connected securely.
Perform final operation check.

CHECKING THE REFRIGERATING CYCLE

(JUDGING BETWEEN GAS LEAKAGE AND COMPRESSOR DEFECTIVE)

1. Troubleshooting procedure (No operation, No heating, No cooling)

Connect U,V,W phase leads to the power module again and operate the air conditioner.

↓

Is the self-diagnosis lamp mode as shown on the right?

Self-diagnosis lamp \ Lighting mode	Blinks 2 times	Blinks 3 times	Blinks 4 times	Blinks 5 times	Blinks 6 times	Blinks 8times
LD301	Blinking	Blinking	Blinking	Blinking	Blinking	Blinking
Time until the lamp lights	Approx. 10 seconds			Approx. 10 seconds	Within Approx. 30 seconds	Approx. 10 seconds
Possible malfunctioning part	Compressor				Gas leakage	Compressor

(Hatched box) Blinking (Empty box) off

YES ↓

Outdoor air temperature (℃)	Charge port pressure MPa(G) {kgf/cm²(G)}
50	2.96 {30.14}
45	2.62 {26.72}
40	2.31 {23.58}
35	2.03 {20.73}
30	1.78 {18.14}
25	1.55 {15.79}
20	1.34 {13.66}
15	1.15 {11.74}
10	0.98 {10.02}
5	0.83 { 8.48}
0	0.70 { 7.10}
−5	0.58 { 5.89}
−10	0.47 { 4.81}

(R410 A)
The values above are the theoretical ones.

Stop to operate and check the gas pressure in balancing mode.

Normal → ● Checking the IPM (main P.W.B.)

↓ When the self-diagnosis lamp lights in the same condition as above.

The compressor is defective. Replace it and seal refrigerant.
(If the compressor checker for an inverter type air conditioner is available, re-check using it.)

Error (Gas leaking) ↓

Gas leaks.
Repair and seal refrigerant.

↓

Perform a final check of operation.

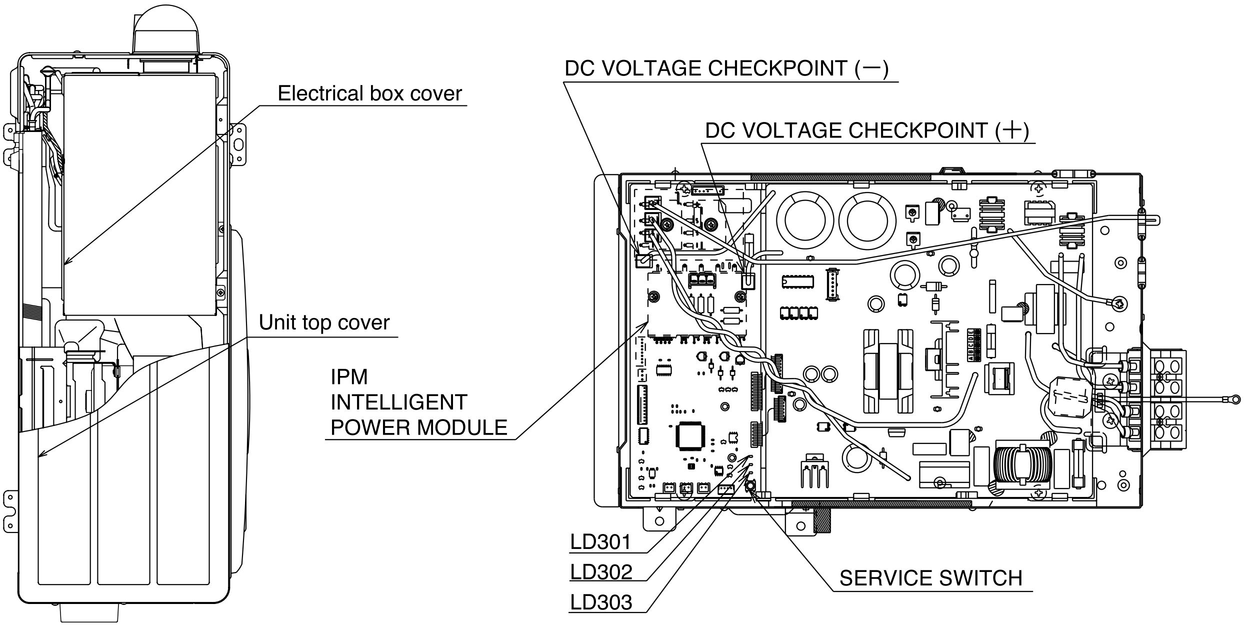
HOW TO OPERATE USING THE SERVICE SWITCH THE OUTDOOR UNIT

MODEL RAC-25JX5, RAC-35JX5

1. Turn off the power switch.
2. Remove the electrical box cover.
3. Turn on the power switch
4. After waiting for 30 seconds, push the service switch for a second.

LD303 (red) will light and the unit will operate in the forced cooling mode at this time.

Never operate the unit for more than 5 minites.



(Cautions)
(1) If interface signal (DC 35V) terminals C and D are not connected when the outdoor unit is in forced cool mode, the outdoor unit defect indicator (LD301) will blink 9 times during operation to indicate communication error.
(2) If checking is done with the compressor connector disconnected, the unit will stop and LD301 will blink 4 times.

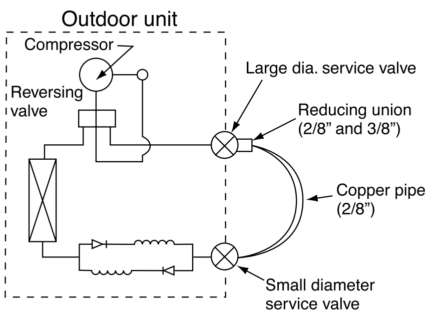
Be sure to push the service switch for a second again to stop the forced cool operation.

HOW TO OPERATE THE OUTDOOR UNIT INDEPENDENTLY

1. Connect the large dia. pipe side and small dia. pipe side service valve using a pipe.

Connect the small diameter service value and the large diameter service valve using the reducing union and copper pipe as shown on the right.

Charge refrigerant of 300g after vacuuming (※1)



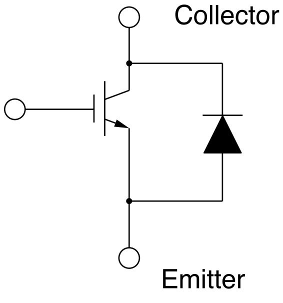
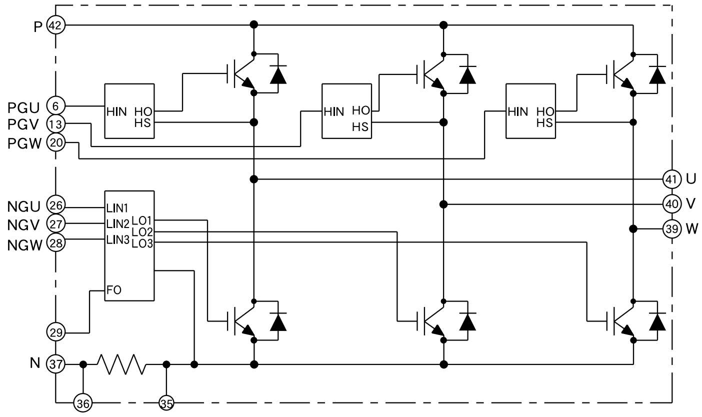
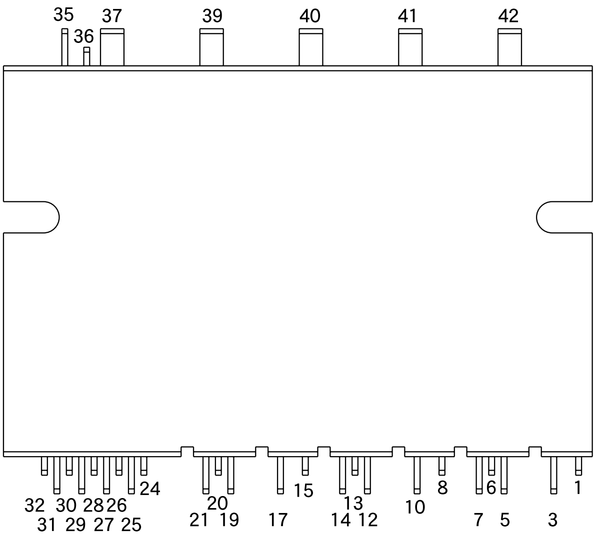
Parts to be prepared

(1) Reducing union
 2/8" (6.35 mm)
 3/8" (9.52 mm)
(2) Copper pipe (2/8" and 3/8")

Do not operate for more than 5 minutes

The operation method is the same as "How to operate using the connector to servicing the outdoor unit".
※1 The charging amount of 200g is equivalent to the load in normal operation.

IPM (Intelligent Power Module) DIAGNOSIS

	SSM1001MA
Circuit diagram of the device	
Circuit diagram of the module	
Terminals symbol mark of the module ※See next page for measuring value using multimeter	 6:PGU 13:PGV 20:PGW 26:NGU 27:NGV 28:NGW 29:Fail signal 35:INV0V 36 :0V 37:N 39:W 40:V 41:U 42 :P

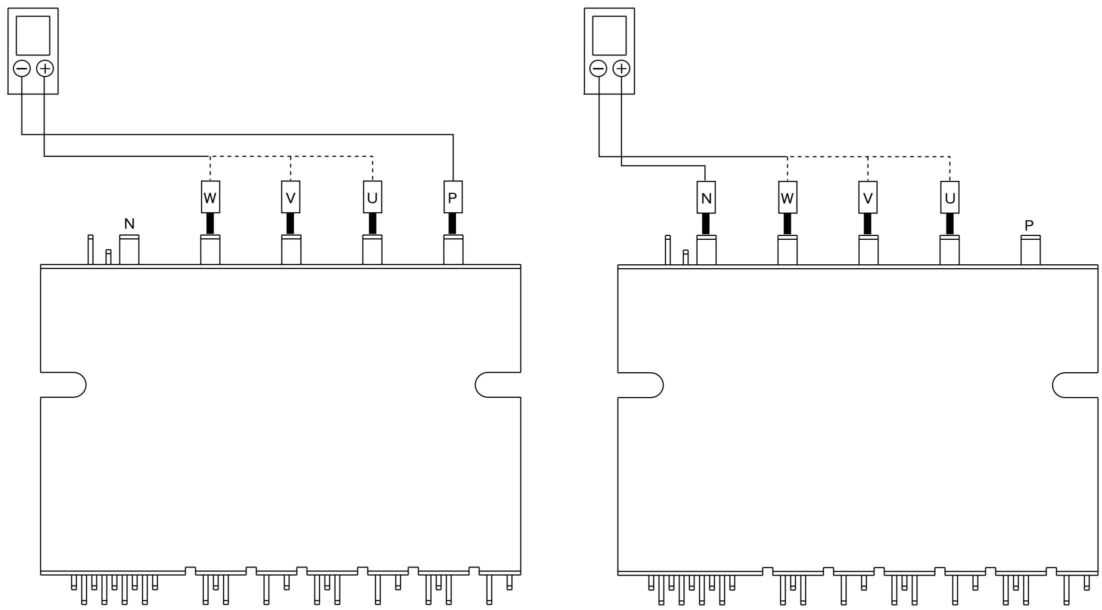
Diagnosis procedure of IPM using multimeter.

<Inverter section>

Set the multimeter function to resistance x 100.If the multimeter dose not have x 100 range, please select its range from x 1 to x 100.
The judgment shall be OK. When the measurement was high resistance.
(Please consider that the probe polarity will be reserve when use a digital mulimeter due to its battery connection inside)

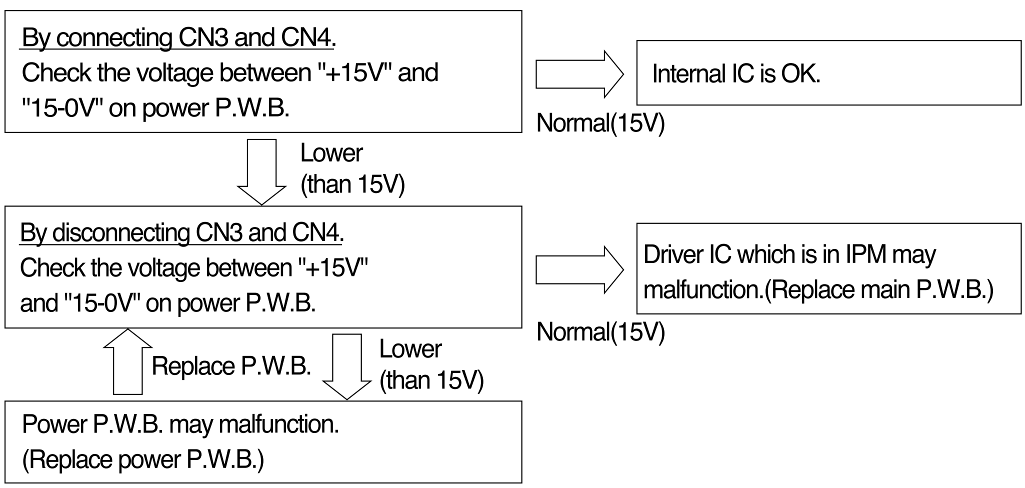
<note>

Sometimes, it may misjudge as OK because of low conductivity when power module was damaged as disconnect mode. In this case, please check the resistance by reversing the probe polarity and consider OK when it was low resistance. Also, it is OK if the resistance was as same as the other phases (U,V,W).



<Driver circuit (internal IC)>

15V will not be generated when the internal IC has malfunctioned.
To find the malfunction either the power supply of power P.W.B. or internal IC, please follow the procedure following.

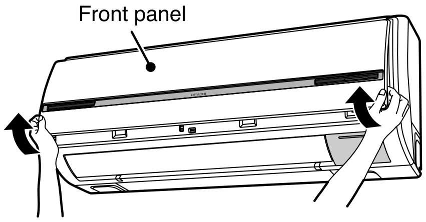


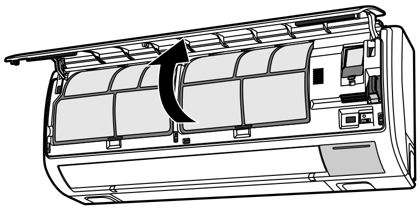
PROCEDURE FOR DISASSEMBLY AND REASSEMBLY

〈INDOOR UNIT〉 MODEL RAS-25JX5, RAS-35JX5

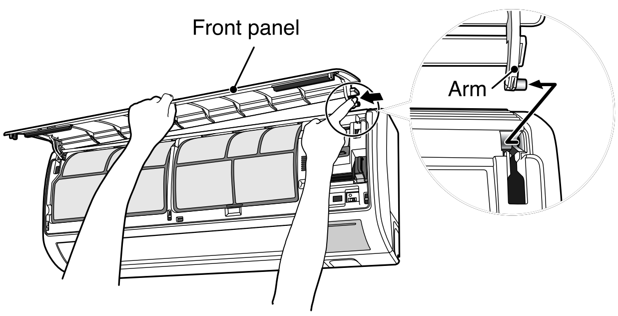
1. Front Panel, Air Purifying Unit

(1) Hold both sides of the front panel and lift up.

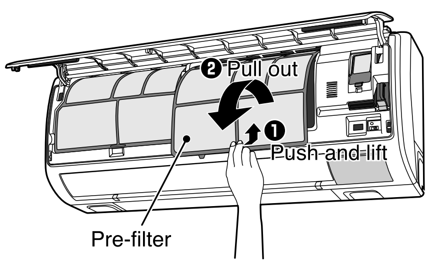




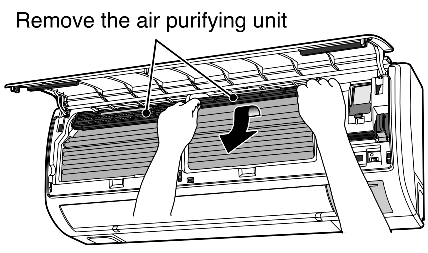
(2) When the front panel is fully opened with both hands, push the right arm to the inside to release it, and while closing the front panel slightly, put it out forward.



(3) Pull out the pre-filters on the right and left.

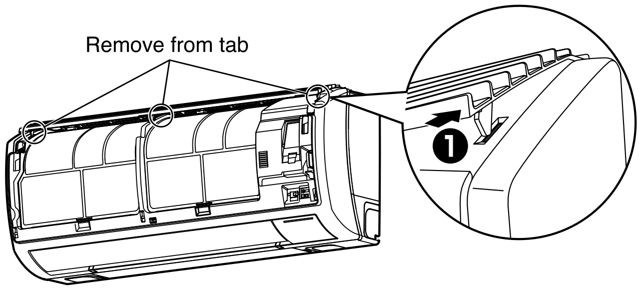


(4) Remove the air purifying unit (2 pieces) by pulling out while pushing up with both hands.

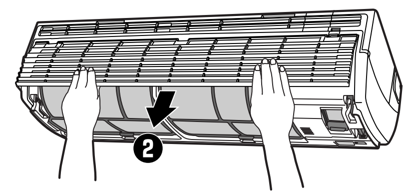


2. Top Grill, Front Cover

(1) Lift up while pressing the top grill and remove from tab. (3 places: left, center and right)

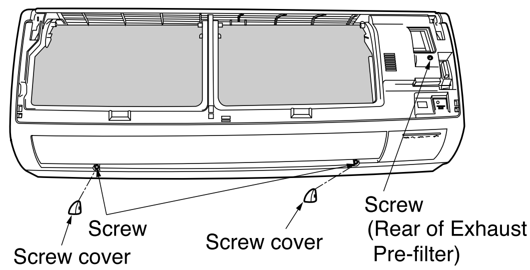


(2) Pull forward.

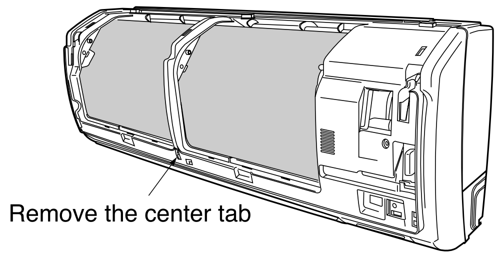


(3) Remove the front panel, pre-filter, air purifying unit, top grill and exhaust pre-filter.

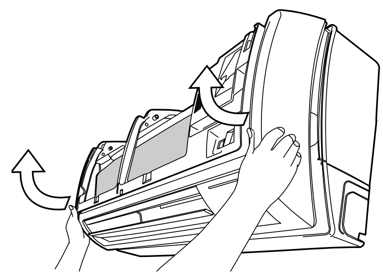
(4) Remove the screw cover at the bottom of the front cover and remove the screw.



(5) Remove the center tab of the front cover (1 place).

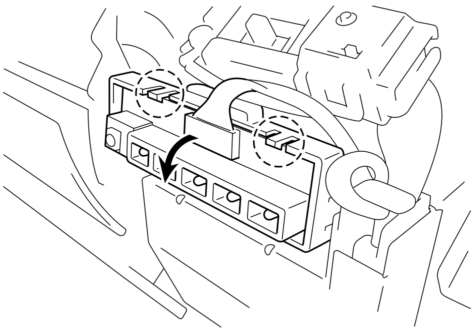


(6) Place your hands on both sides of the front cover and remove while pulling in the direction of the arrow.



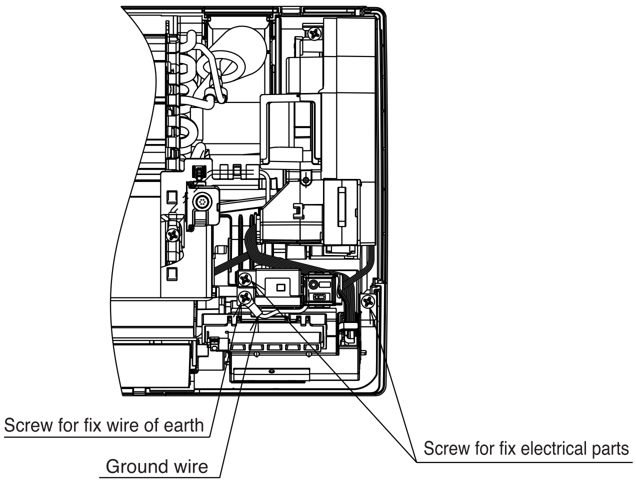
3. Indicating P.W.B.(at display panel)

(1) Remove the lead wire (CN2).
(2) Detach the claws for fixing the P.W.B. and pull out the P.W.B. towards you.



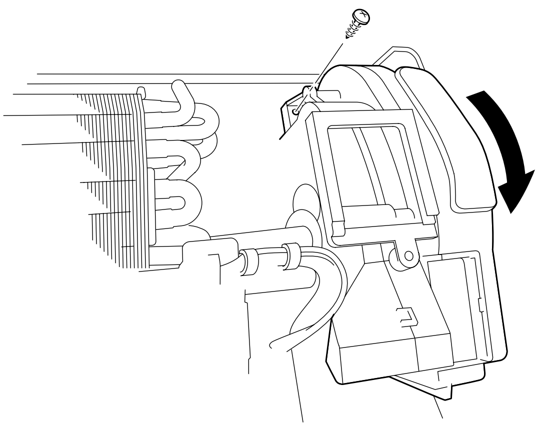
4. Control P.W.B.

(1) Hold the both sides of the electrical parts cover and remove it by pulling out towards you.
(2) Remove each lead wire and earth wire lock screw from the control P.W.B.
(3) Remove the electrical parts lock screws (2 points).
(4) Pull out the electrical parts towards you.
(5) Detach the P.W.B. lock claws (3 points) and lift up the control P.W.B. towards you from the right side to remove it.



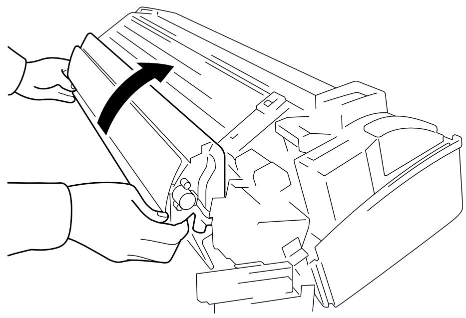
5. Two way air exchange unit

(1) Remove the lock screw on the top surface and remove the unit by rotating it downwards.



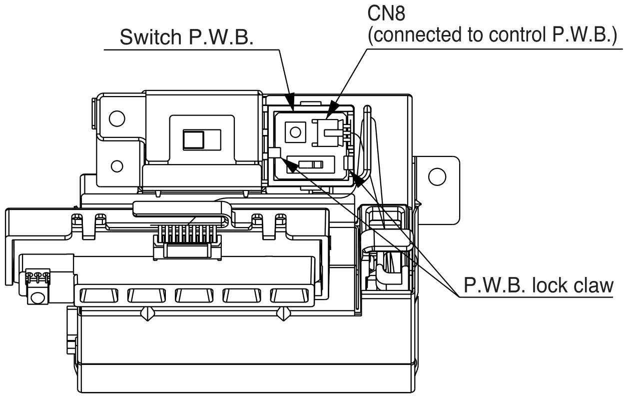
6. Dew-free assembly

(1) Detach the claws (2 points) fixed to the cabinet.
(2) Hold the both sides of the dew-free assembly and remove it by pulling out its lower side and then rotating it upwards.



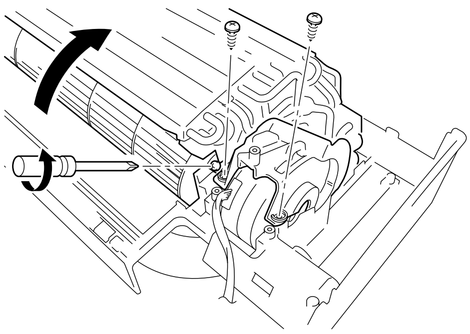
7. Indicating P.W.B.(at switch)

(1) Remove the switch cover and lead wire (CN8).
(2) Remove the right side of the P.W.B. lock claw.
(3) Remove the board from the right side by lifting up towards you.



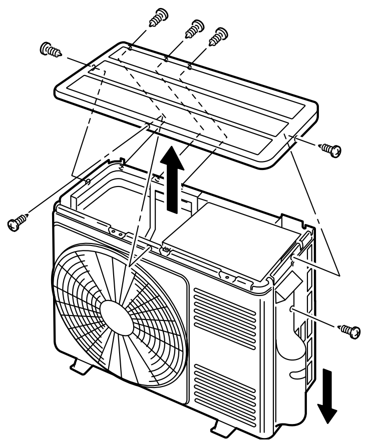
8. Cross-flow fan and fan motor

(1) Remove the bearing cover lock screw on the left side of the evaporator.
(2) Pull the left side of the evaporator towards you while lifting it up and detach the claw on the lower side of the bearing cover.
(3) Remove the pipe cover on the right side of the evaporator.
(4) Remove the fan motor holder lock screw and detach the claw of the holder by pushing the lower side of the holder upwards.
(5) Loosen the fan lock screw and remove the fan.
(6) Remove the fan motor by rotating it towards you.

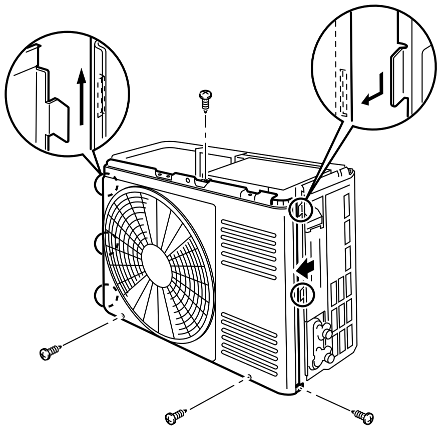


1. Electrical parts

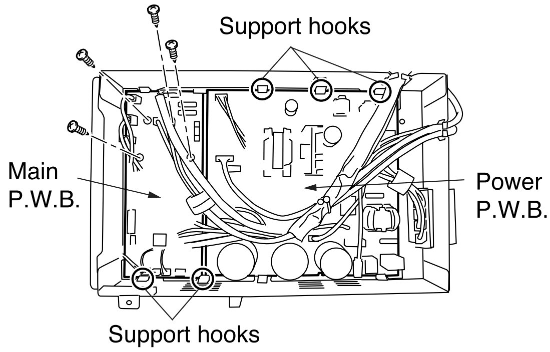
(1) Remove the service value cover lock screws and lower the cover to remove it.
(2) Remove the top cover lock screw and raise the cover to remove it.



(3) Remove the front cover lock screw.
(4) Lower the right side of the front cover and pull it forward. Then, remove the cover from the hook.
(5) Pull the right side of the front cover a little and pull up the left side to remove it from the hook.

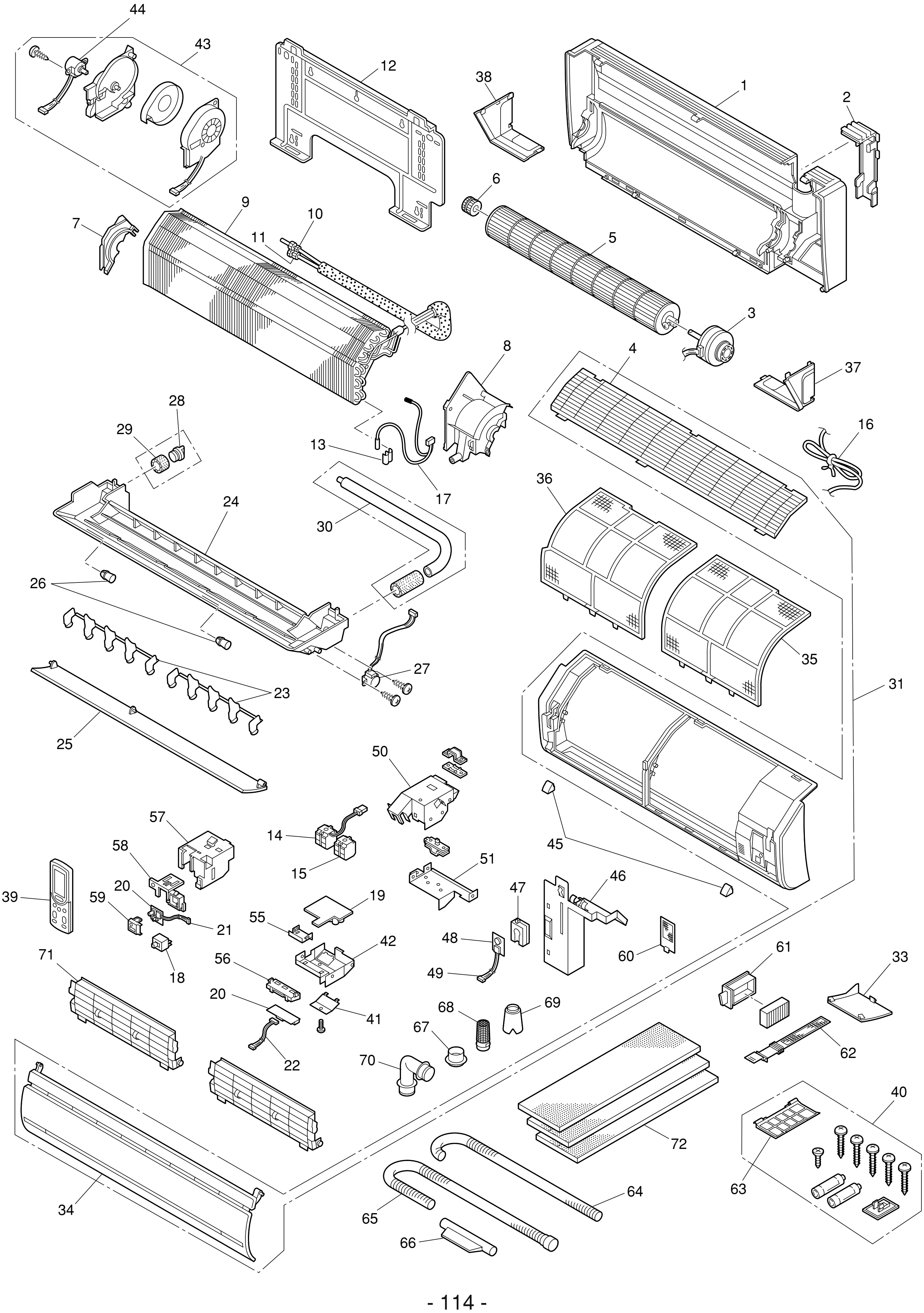


(6) Remove each connector and earth cable from the lead wire.
(7) Remove four lock screws from the main P.W.B. and pull two support hooks at the front side to remove the P.W.B.
(8) Pull three support hooks at the rear side of the Power P.W.B. to remove the P.W.B.



PARTS LIST AND DIAGRAM

INDOOR UNIT
MODEL: RAS-25JX5, RAS-35JX5



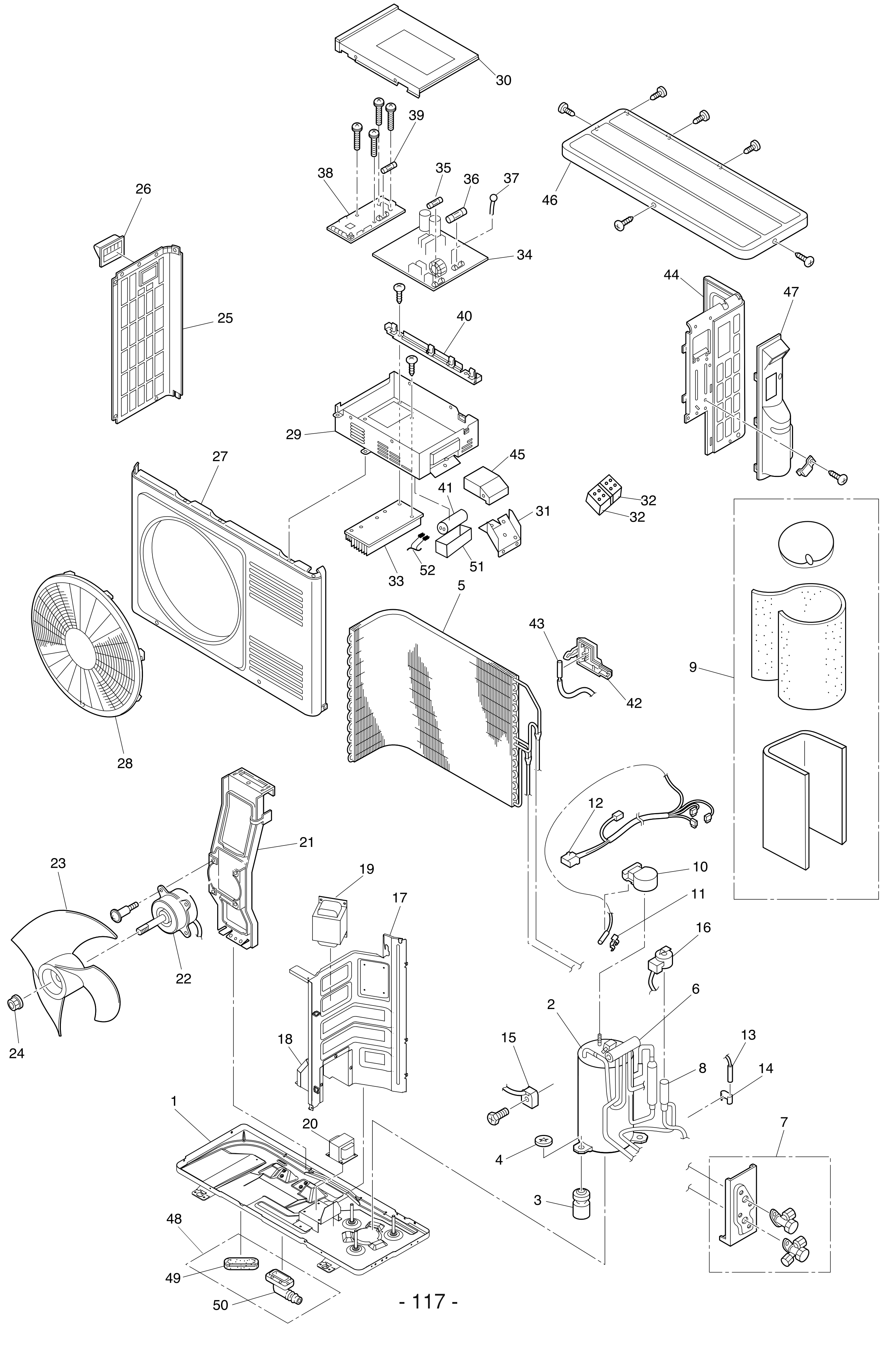
INDOOR UNIT

NO	PARTS NO.		Q'TY	PARTS NAME
	RAS-25JX5	RAS-35JX5		
1	HWRAS-D10EX 901		1	CABINET
2	HWRAS-D10EX 902		1	UPPER COVER
3	HWRAS-D10EX 903		1	FAN MOTOR 25W 1.1KG
4	HWRAS-D10EX 904		1	GRILL
5	HWWSI425 905		1	TANGENTIAL AIR FLOW FAN
6	HWRAS-D10EX 905		1	FAN SUPPORT ASSEMBLY
7	HWRAS-D10EX 906		1	FAN COVER
8	HWRAS-D10EX 907		1	FAN MOTOR SUPPORT
9	HWRAS-D10EX 908		1	EVAPORATOR ASSEMBLY
10	HWRAS-25YH4 912		1	UNION (2)
11	HWRAS-25YH4 913		1	UNION (3)
12	HWRAS-D10EX 910		1	MOUNTING PLATE
13	HWRAS-25YH4 915		1	THERMISTOR SUPPORT
14	HWRAS-D10EX 911		1	TERMINAL BOARD (2P)
15	HWRAS-25YH4 917		1	TERMINAL BOARD (2P)
16	HWRAS-D10EX 912		1	POWER SUPPLY CORD
17	HWRAS-D10EX 913		1	THERMISTOR ASSEMBLY
18	HWRAS-D10EX 914		1	POWER SWITCH
19	HWRAS-D10EX2 901	HWRAS-D14EX2 901	1	P.W.B. (MAIN)
20	HWRAS-D10EX 916		1	P.W.B. (INDICATION)
21	HWRAS-D10EX 917		1	CONNECTING CORD (3P)
22	HWRAS-D10EX 918		1	CONNECTING CORD (9P)
23	HWRAS-D10EX 919		2	VERTICAL AIR DEFLECTOR
24	HWRAS-D10EX 920		1	DRAIN PAN
25	HWRAS-D10EX 921		1	HORIZONTAL AIR DEFLECTOR
26	HWRAS-25YH4 928		2	DEFLECTOR SUPPORT
27	HWRAS-D10EX 922		1	AUTO SWEEP MOTOR
28	HWRAS-25YH4 930		1	DRAIN CAP
29	HWRAS-25YH4 931		1	HEAT INSULATOR PIPE
30	HWRAS-D10EX2 902		1	DRAIN HOSE
31	HWRAS-D10EX 924		1	FRONT COVER ASSEMBLY
33	HWRAS-D10EX 926		1	COVER (SWITCH)
34	HWRAS-D10EX 927		1	FRONT PANEL
35	HWRAS-D10EX 928		1	AIR FILTER (R)
36	HWRAS-D10EX 929		1	AIR FILTER (L)
37	HWRAS-D10EX 930		1	COVER (LOWER)(R)
38	HWRAS-D10EX 931		1	COVER (LOWER)(L)
39	HWRAS-D10EX 932		1	REMOTE CONTROL ASSEMBLY
40	HWRAS-D10EX 933		1	SCREW ASSEMBLY
41	HWRAS-D10EX 934		1	COVER (TERMINAL)
42	HWRAS-D10EX 935		1	ELECTRIC COVER (UPPER)
43	HWRAS-D10EX 936		1	UNIT (SUPPLY AIR & EXHAUST)
44	HWRAS-25YH4 929		1	STEPPING MOTOR FOR DAMPER
45	HWRAS-D10EX 938		2	SCREW COVER (FRONT COVER SCREWS)
46	HWRAS-D10EX 939		1	PIPE COVER (RIGHT)
47	HWRAS-D10EX 940		1	COVER (GAS SENSOR)

INDOOR UNIT

NO	PARTS NO.		Q'TY	PARTS NAME
	RAS-25JX5	RAS-35JX5		
48	HWRAS-D10EX 941		1	P.W.B. (GAS SENSOER)
49	HWRAS-D10EX 942		1	CONNECTING CORD (3P)
50	HWRAS-D10EX 943		1	ELECTRIC BOX
51	HWRAS-D10EX 944		1	ELECTRIC COVER (LOWER)
55	HWRAS-D10EX 948		1	COVER (POWER SWITCH)
56	HWRAS-D10EX 949		1	SUPPORT (INDICATING P.W.B.)
57	HWRAS-D10EX 950		1	SUPPORT (MAIN P.W.B.)
58	HWRAS-D10EX 951		1	SUPPORT (POWER SWITCH)
59	HWRAS-D10EX 952		1	COVER (TEMPORARY SWITCH)
60	HWRAS-D10EX 953		1	FILTER (EXHAUST)
61	HWRAS-D10EX 954		1	FILTER (SUPPLY AIR CLEANING)
62	HWRAS-D10EX 955		1	FILTER (SUPPLY AIR)
63	HWRAS-D10EX 956		1	PIPE SUPPORT (REAR)
64	HWRAS-D10EX 957		1	AIR DUCT (ϕ 20mm)
65	HWRAS-D10EX 958		1	AIR DUCT (ϕ 25mm)
66	HWRAS-D10EX 959		1	AIR DUCT
67	HWRAS-D10EX 960		1	JOINT (AIR DUCT)
68	HWRAS-D10EX 961		1	INSECT REPELLENT STRAINER (SUPPLY AIR)
69	HWRAS-D10EX 962		1	HOOD (REPELLENT STRAINER)
70	HWRAS-D10EX 963		1	ELBOW JOINT (AIR DUCT)
71	HWRAS-D10EX 964		2	C-CASE
72	HWRAS-D10EX 965		3	HEAT INSULLATOR SHEET (220$\times$350$\times$2.5t)

OUTDOOR UNIT
MODEL: RAC-25JX5, RAC-35JX5



OUTDOOR UNIT

NO	PARTS No.		Q'TY	PARTS NAME
	RAC-25JX5	RAC-35JX5		
1	HWRAC-D10EX2 901		1	BASE
2	HWRAC-25YH4 902		1	COMPRESSOR 1000W 9.7kg
3	HWRAC-25YH4 903		3	COMPRESSOR RUBBER
4	HWRAC-25YH4 904		3	PUSH NUT
5	HWRAC-D10EX2 902		1	CONDENSER
6	HWRAC-D10EX2 903		1	REVERSING VALVE
7	HWRAC-25YH4 907		1	SERVICE VALVE ASSEMBLY
8	HWRAC-D10EX2 904		1	ELECTRIC EXPANSION VALVE
9	HWRAC-D10EX2 905		1	SOUND PROOF COVER ASSEMBLY
10	HWRAC-E08H 907		1	O.L.R COVER
11	HWRAC-D10EX2 906		1	O.H THERMISTOR SUPPORT
12	HWRAC-E08H 908		1	CONNECTING CORD(COMP)
13	HWRAC-D10EX 908		1	THERMISTOR(DEFROST)
14	HWRAC-25YH4 914		1	THERMISTOR SUPPORT
15	HWRAC-25YH4 915		1	COIL(REVERSING VALVE)
16	HWRAC-D10EX2 907		1	COIL(ELECTRIC EXPANSION VALVE)
17	HWRAC-25YH4 917		1	PARTITION
18	HWRAC-25YH4 918		1	REARCTOR COVER
19	HWRAC-25YH4 919		1	REACTOR1
20	HWRAC-25YH4 920		1	REACTOR2
21	HWRAC-D10EX 911		1	FAN MOTOR SUPPORT
22	HWRAC-25YH4 922		1	FAN MOTOR 40W 1.5kg
23	HWRAC-25YH4 923		1	PROPELLER FAN
24	HWRAC-25YH4 924		1	NUT(PROPELLER FAN)
25	HWRAC-25YH4 925		1	SIDE COVER(L)
26	HWRAC-25YH4 926		1	HANDLE
27	HWRAC-E08H 910		1	FRONT COVER
28	HWRAC-25YH4 928		1	DISCHARGE GRILL
29	HWRAC-25YH4 929		1	ELECTRIC PARTS PLATE
30	HWRAC-D10EX 913		1	ELECTRIC PARTS COVER
31	HWRAC-25YH4 931		1	TERMINAL PLATE
32	HWRAC-25YH4 932		2	TERMINAL BOARD(2P)
33	HWRAC-25YH4 933		1	HEAT SINK(REGURATOR1)
34	HWRAC-D10EX2 908		1	P.W.B.(POWER)
35	HWRAC-E08H 911		1	FUSE(15A)
36	HWRAC-D10EX2 909		1	FUSE(3A)
37	HWRAC-25YH4 937		3	VARISTOR
38	HWRAC-D10EX2 910	HWRAC-D14EX2 901	1	P.W.B.(MAIN)
39	HWRAC-D10EX2 911		1	FUSE(1A)
40	HWRAC-25YH4 940		2	SUPPORT(P.W.B.)
41	HWRAC-25YH4 941		1	CAPACITOR 45 F 200V
42	HWRAC-25YH4 942		1	COVER(OUT DOOR THERMISTOR)
43	HWRAC-D10EX 917		1	THERMISTOR(OUT DOOR TEMPERATURE)
44	HWRAC-D10EX 918		1	SIDE COVER(R)
45	HWRAC-25YH4 945		1	TERMINAL COVER
46	HWRAC-25YH4 946		1	TOP COVER
47	HWRAC-25YH4 947		1	SERVICE VALVE COVER
48	HWRAC-25YH4 948		1	BUSH ASSEMBLY
49	HWRAC-25YH4 949		1	BUSH
50	HWRAC-25YH4 950		1	DRAIN PIPE
51	HWRAC-25YH4 951		1	COVER(CAPACITOR)
52	HWRAC-E08H 914		1	CORD ASSEMBLY

HITACHI

RAS-25JX5 / RAC-25JX5
RAS-35JX5 / RAC-35JX5

AW NO. 0013E

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